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2 + 2 = 5

"LIKE being nibbled to death by a duck," was one of the best descriptive phrases coined by Franklin D. Roosevelt. The harried top-hatted gentleman, Heavy Industry, is already frayed around the edges from steady nibbling, and the duck is all set to move in for some good beaky bites of solid red meat.

What with the flurry of CIO court suits to capture portal-to-portal pay retroactively to 1938, and impending demands for a new round of wage increases, industry executives are unhappily of the opinion that neither their balance sheets nor the general economy can absorb the punishment.

The Nathan report, presented with fanfare last week, is to be the CIO's siren song to beguile public opinion while they jimmy open the coffers for more money. The report hammers the thesis that heavy industry profits are so large that wage increases can be absorbed; that wages constitute a small percentage of industry costs, and that cost-of-living has outrun wages. It all makes convincing reading—percentages and half-truths are frequently the means of making five out of two plus two in order to advance selfish aims.

To the high profits of certain consumer goods industries, textile, food and building industries, the Nathan report adds the much lower profits of the metals and automotive industries. The juicy average so obtained is used to justify new wage demands on the latter. The mathematics are O.K. but the assumptions are deliberately belabored—kind of like averaging Gypsy Rose Lee's salary to that of the upstairs maid to establish the latter's ability to purchase a fur coat. Nathan employs the same statistical chicanery of averaging low labor cost industries to high in order to prove that wage advances in the metals and automotive industries involve only about a third of the total cost. Nonetheless, the makeup of the metals and automotive industries is such that higher wages immediately affect parts suppliers and promptly translate themselves into higher prices. As for living costs outrunning wages, Nathan adopts the statistical trick of employing different base years to prove his point. Established and recognized indexes for the years 1929 to 1946 show just the converse.

There are no miracles in economics, even Nathan economics! Every price and wage increase, unless offset by greater productivity and production is an increased cost to someone else. And that someone else is labor itself—that great unorganized percentage of labor—the pensioners and the others living on fixed incomes. They have not even begun to catch up with the first round of stiff wage increases won by the militant and aggressive unions, and they won't for many years. Now a second round is in prospect before the first is even partially digested.

Temporarily, the organized workers in heavy industry can ask, and perhaps win, quick wage increases with the productive machine in low gear. But the cost is being shouldered by some 40 to 50 million other workers who are quietly and undramatically being squeezed out of the buying market.

The CIO seems determined to liquidate its long-term interests through short-term raises which melt away as the economy staggers up another twist of the inflationary spiral.

T. W. Lippert

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► An automobile engine now reportedly in the experimental stage has a 6-in. bore, idles smoothly at 60 rpm, and develops full power at 1800 rpm. Also under consideration is a new type of automobile body without fenders and with a bumper extending completely around the body.

► Despite talk of a world surplus of crude rubber there will not be enough to go around next year and synthetic will have to fill the gap. The shortage is partly due to the prewar rubber cartel dominated by the major foreign producers. This cartel might have cost us the war had we not borrowed crude rubber from British stockpiles to mix with American made synthetic.

► The Moscow radio reports the existence of steel mills in Kazakstan, near the Caspian Sea, close to large iron ore deposits discovered there during the war. The plant is said to be located 15 miles from Karaganda.

► WAA has just about cleaned up the vast job of disposing of billions of dollars worth of surplus aircraft. This has been accomplished in a little over 2 yr from its inception.

► An order for the third cyclatron magnet to be made in this country has been placed by Harvard University. The installation will be similar to those of Columbia University and the University of Rochester but the forgings for the Harvard cyclatron are not quite as large, weighing but 645 tons.

► Tests indicate that the advantages of using graphite nipples for carbon electrodes include approximately 50 pct greater strength and 185 pct better electrical conductivity. Thermal expansion of the nipple is lower and it can be readily machined to closer tolerances. One disadvantage is their higher cost.

► Though not competitive in cost with rods produced by other methods an interesting powder metal development is an 18-8 welding rod. Very satisfactory welding characteristics are found in this rod which is made from extruded powdered metal sintered in a hydrogen atmosphere.

► Through direct and indirect taxes this year the Government will take away and spend some $27 a week per family, as compared with $8 and $11 respectively per family in 1929 and 1939. This is one small facet of a National Association of Manufacturers' economic survey on which 80 economists worked for 6 months, concluding that depressions can be prevented.

► Machine guns are just about useless for planes making more than 600 mph and new weapons must be found in their stead, the American Rocket Society convention was told. The group also heard that rockets may not only replace battleship guns but are handy in case a truck gets stuck in the mud.

► From an official of Westinghouse, the company that built electric torpedoes that sank 372 Japanese ships during the war comes the predicted development of torpedoes that can be fired 1000 ft under water and race to targets miles away at heretofore unattained speeds. The electric torpedo of World War II had a homing device to guide it toward the sound of a moving vessel.

► The price of palm oil, a vital ingredient in the manufacture of tinplate, has more than doubled in the past few months. It is imported principally from Africa and though substitutes were used during the war they did not prove uniformly satisfactory. This is but one factor contributing to rising tinplate costs which will probably be reflected in a 15-pct price increase next year.

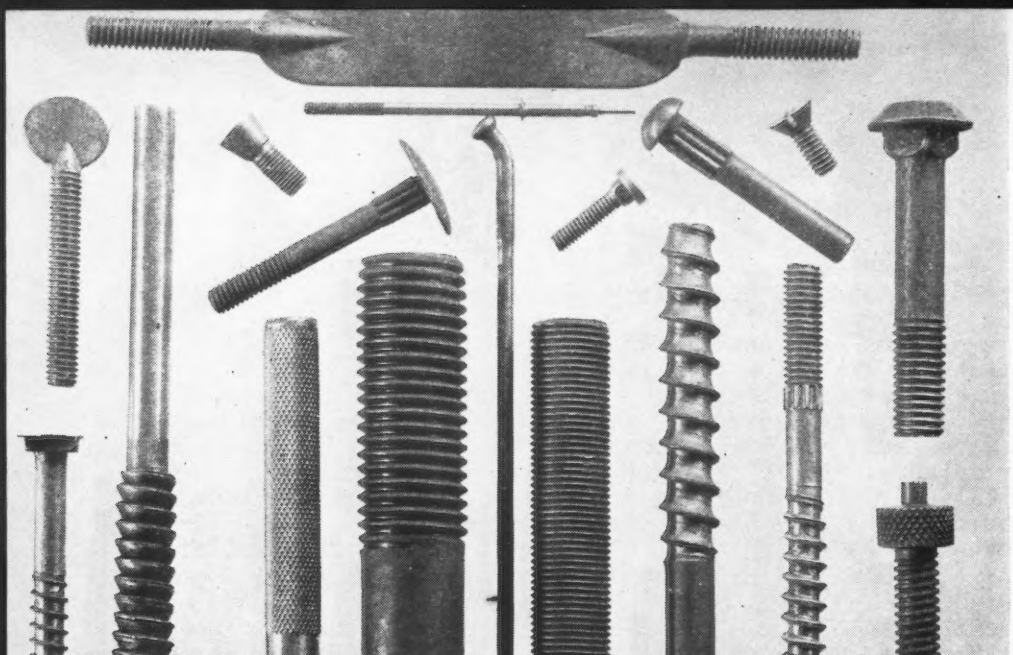
► It appears that the price of automobile storage batteries will be in the neighborhood of $35 or higher by next spring. Lead, the vital ingredient, has already jumped 83 pct in price since June.

► A publicity drive to promote the utilization of 1400 Bios-Fiat technical reports on German industry is being sponsored by the British Board of Trade. Some 3000 teams made up of 10,000 investigators prepared the published reports, all of which have been distributed to libraries, research and trade associations. The Board admits that unpublished reports of another 1600 teams are still marked "Secret" or are otherwise unavailable to industry.

► Radar waves from 1.2 to 1.6 cm in length have found a new use in a microwave spectroscope developed for the analysis of chemical substances. Like the infrared spectroscope to which it is similar, the microwave spectroscope can identify the more complicated molecules such as hydrocarbons without the laborious chemical processes involved in breaking them down for analysis.

► The guaranteed wage issue is up again in the steel industry--this time in Britain where London reports state that steelworkers there are to be guaranteed full wages for 4 days a week. The guarantee does not apply if the plant is struck or made idle through avoidable absenteeism.

► The Swedish air force, as part of a 5-yr plan to expand its military aviation will soon take delivery on 90 P-51 Mustangs from the U. S. Foreign Liquidation Commission in Paris. The North American P-51 was regarded by both British and American fighter pilots as one of the best ships in the Allied hangar.



Thread Rolling—

Theory and Practice

o o o

By J. W. BATCHELDER
Ascutney, Vt.

o o o

IT has long been recognized that technological development is one of the best of the relatively few available means of meeting competition. Prior to participation of the United States in World War II, price warfare in the screw industry reduced profits to the point where only the most efficiently operated plants could afford to invest in further improvements. Those in this group, therefore, had an opportunity to modernize their equipment and refine their practices, thereby further solidifying their position, while holding competitors practically at a standstill.

Considering the competitive aspects of overlooked opportunities, double acting thread rolling machines have frequently been the subjects of patents and trade literature. Various forms of flat die machines have been invented to roll screws on both the forward and return stroke, to accommodate two screw blanks at each pass of the moving die, or to otherwise roll threads on a plurality of blanks at each cycle of operation. So far as is known none of these ideas have reached a commercial state of development. The possibilities offered, however, seem to justify further attention since new techniques may well have removed the earlier obstacles.

Although dual operation may not have been successful as applied to flat die machines, round die machines can be developed to the point where the double acting feature might be successfully applied. Round die machines equipped for dual operation possess potential production possibilities of 240 to 300 ¼ or 5/16-in. screws per min rolled to a maximum combined error of 0.0005 in. or less. The work capacity of such machines could be easily made to extend from ¼ to 2-in. diam, with a thread length up to 4 in. on the smaller

sizes. The setup time could be minimized by using direct reading vernier scales so that knowing the die and work pitch diameter, the operator could, by adding together the two pitch diameters, set the machine to produce threads within the prescribed tolerance range and eliminate considerable time lost by trial and error.

Although it is necessary that the speed of the penetration stroke be variable over a comparatively wide range, the return or opening stroke should be maintained at a constant maximum permissible speed so that production will not be unnecesarily sacrificed.

While it is a very simple matter to build a wide size range into round die thread rolling machines, wide range adjustments are not practical with automatic feeding hoppers, chutes, etc. At the present time it seems more practical to hand feed work over 5/8-in. diam, and to employ quickly interchangeable feeding apparatus adjustable from 1/4 to 7/16 in., 3/8 to 9/16 in., and 1/2 to 5/8 in. to handle the more popular screw sizes. A nonrepeat single cycle feature is recommended for use when hand feeding, as well as some dependable form of mechanical overload protection in case oversize blanks are accidentally encountered. Such machines offer increased production per operator, better quality of work and require less floor space than present comparable sizes of flat die machines.

Adequate facilities are already in existence for making dies for such a thread roller, including standard thread grinders capable of producing extremely accurate die threads completely free of the effects of heat treating distortion. Other correspondingly important advances can be made in the thread rolling field.

During World War II the Watson-Flagg Machine Co. introduced an American version of the German Pee-Wee thread roller. Edward N. Steinle has also recently undertaken the American distribution of the British model of the same type of machine manufactured by Leo Steinle. Other concerns have also acquired from the Alien Property Custodian the rights to manufacture this type of thread roller in the United States. The machine introduced by the Rolled Thread Die Co., also during the war, employs three round dies instead of two, equally spaced about the work being rolled. The dies are relatively small. The National Electric Welding Machines Co. introduced a hydraulically operated flat die thread roller, both of whose flat dies move in such a way as to provide penetration control.

So far as is known, none of these new thread rollers are provided with automatic feeds. Therefore they cannot compete from a production standpoint with the older models of flat die machines, although they produce very good threads. While it would be interesting to describe further these new machines, to do so would duplicate articles published during the past few years. These articles are among those listed in the bibliography following this text.

A review of the trade literature and United States and many foreign patents on thread rolling, regarding both machines and dies, shows that all practical, and some impractical, ways of rolling screw threads have long since been invented. The earliest United States thread rolling patent found was issued to Hazard Knowles of Colchester, Conn., Apr. 1, 1831. No specification is available but the drawing clearly shows a pair of flat dies. This patent was reissued Mar. 1, 1833 and printed copies of the complete reissued patent are obtainable. This patent was very clearly and concisely drawn up. Among other things, it points out that, ". . . one of the plates (dies) may be made convex and the other concave, and one of them may be attached to the periphery of a wheel, the other remaining at rest either above or below it, and the pressure being produced by a slight difference between the convexity of one and the concavity of the other or by a little eccentricity of the circles upon which one rests and the other moves."

Mr. Knowles goes on to say that he prefers to use flat dies actuated by a cam instead of a crank. These patents bear no number since they were issued before the present patent numbering system was adopted. Many of the other thread rolling patents are no less interesting. Some of them pertain to machines using dies that could be made at the time of their invention only with extreme difficulty. They embody very sound ideas and principles invented much too soon. It was not until the comparatively recent development of the internal thread grinder that internally threaded curved dies became practical. Many of the early thread rolling inventions employed dies of this type.

Full utilization of the potentialities of thread rolling requires a full understanding of the process. In this series of articles, thread rolling machines and practices are explained in detail. In this, the first article of the series, the author discusses some of the basic concepts of thread rolling and describes the evolution of thread rolling equipment.

As a basis for the recent design of a new type of thread rolling machine intended to combine precision with high production rates, it was important to ascertain the degree of penetration force necessary to fully form screw threads. With this and other objects in mind, considerable domestic and foreign trade literature was perused. The penetration forces required, of course, vary according to blank material and hardness, number of work turns, screw diameter and thread pitch. The Germans wrote profusely about such matters, but in no instance was a figure found qualified by all of the variable factors. In every case at least one of the necessary qualifying characteristics was omitted. Not finding reliable data in this respect, simple experimental apparatus was designed and built which provided the necessary knowledge, and in addition revealed the nature of some previously misunderstood phenomena.

Screw blanks can easily be fed in less than one fifth of the operating cycle. Apparently since half of the cycle of the flat die machines is devoted to returning the slide, then three tenths of the cycle is not being used. This is a small amount of time when considering only one stroke. The same proportions hold, however, during the total time that the machine is in operation. Three tenths of a 45-hr week is 13.5 hr lost per machine. On round-the-clock schedules during the war, the time lost on each flat die machine amounted to 50.4 hr on the same basis. At 80 screws per min, this amounts to over 240,000 screws per week per machine. Viewing the situation from another angle, three thread rollers out of every ten would

have been unnecesary were the operating cycle more efficiently utilized. The quick return feature of the National Machinery Co. thread roller holds an advantage in this respect. Hazard Knowles' cam idea back in 1833 was a step in the right direction. Round die machines are not subject to this handicap.

Ropey Threads

Commercial screw blanks must vary somewhat in diameter to obtain reasonable economy of the extrusion dies. These extrusion dies wear, and to hold the blanks exact would involve premature condemnation of the extruding dies. If the slope at the starting end of the stationary flat die, where the blank first contacts it, forms an angle of approximately 2° with the moving die, then each 0.002 in. variation in blank diameter results in a variation of the starting

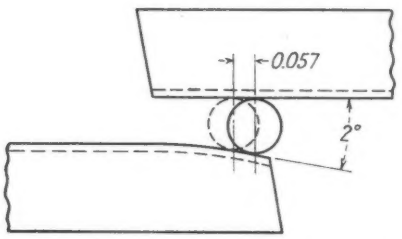


FIG. 1—When the angle between the moving die and the starting radius of the stationary die is 2°, a variation of 0.002 in. in the diameter of the blank will cause a variation of 0.057 in. in the axial starting position.

position of the blank of about 0.057 in. If the die has a helix angle of 3°, then 0.057 in. variation in the starting position of the blank produces 0.003 in. variation in the matching of the screw threads, with the result that the threads are ropey or drunken to this extent. Fig. 1 illustrates this point graphically. This condition can be alleviated if a back stop can be made to move for a short distance, slightly greater than the variation in axial starting position of the blanks, at a rate of speed exactly equal to one half of the speed of the moving die.

Ropey threads cannot be detected by means of ordinary ring thread gages. When staged on an optical thread projector, the presence of ropiness is quickly detected. If the screws are staged correctly, the degree of ropiness is immediately apparent. Acquisition of and guidance by reliable apparatus for measuring ropiness cannot be too strongly urged.

Six or eight sizes of flat die machines are available to cover a range of screw sizes from No. 4 to 1-in. diam. Frequently the same size and pitch screw is rolled on two or more different sizes of machine. This is particularly true when more work turns are employed for rolling harder wire. Although exceptional, one screw manufacturer rolls No. 10 screws on No. 40 Waterbury-Farrel machines.

Stocks of flat dies, therefore, frequently contain considerable screw size and pitch duplications on different sizes of dies. Such duplication is unnecessary with round die machines which can quite conveniently cover a screw size range considerably in excess of No. 4 to 1-in. diam. In other words, round dies differ according to helix angle, pitch and width whereas flat dies also differ according to size of the machine. Excepting the new National Electric Welding Machines Co. thread roller, the length and shape of mating flat dies are also different while all round dies in a set are alike.

One of the principal differences between round and flat die machine lies in the fact that once round dies have been set up in properly matched relationship, the work blank can be introduced between the dies at any time. In other words, it is unnecessary to time the insertion of the blank with the rotational position of the dies. Consequently, variation in blank diameter in no way contributes to ropiness as is the case with flat dies as shown in fig. 1. Furthermore, no part of the time cycle is lost awaiting alignment of watch points when feeding the blanks to round dies.

All of the new thread rolling machines embody means for readily controlling the rate of penetration. Although flat die contours or profiles can be modified to regulate the penetration rate within certain limits, the number of work turns is fixed with any given length of die. The penetration force required for rolling threads varies with the penetration rate. Much less force is required to roll a full thread in 15 than in 5 work turns.

Since with round die machines, the number of work turns can be easily varied over a very wide range by changing the speed of the revolving dies or changing the rate at which they are brought together, or both, the required penetrating force can be alleviated, when rolling coarse pitch threads, by employing more work turns.

About 20,000 lb penetrating force is required per inch of thread length to fully form threads on the average size of blank material and hardness, with the average number of penetration turns that can be secured with standard conventional flat dies. Larger blank diameters, certain types of steel, harder blanks, coarser pitches and fewer work turns require considerably higher penetration forces per inch of thread length.

During the thread rolling action, the force required to cause the die threads to displace the blank material varies greatly from the start to the finish. Very little force is required for the first ten thousandths or so of penetration. A very sharp increase in force is necessary to flatten the crest ridges on the work. When parts of the machine, and particularly the dies, are stressed above a certain point, termed the fatigue or endurance limit, their life is very materially shortened. The machine parts can be made large, thus increasing the moments of inertia of the various sections subjected to stress, and lowering the extreme fibre stresses accordingly. The physical proportions of the die threads, however, cannot be changed since they are fixed by unalterable limits. The only alternative, therefore, so far as the die threads are concerned, is to minimize the stresses therein. Since the resistance to penetration increases as penetration progresses, it follows that the penetration forces vary greatly as the work proceeds along the face of the die. It is, therefore, important to so proportion the profile of flat dies as to even out the peak resistance to penetration in an effort to stay below the endurance limit of stress of the die material.

Machine Deflection

The National Boltmakers have tie bars above and across the dies which serve to substantially reduce deflection of that part of the frame which holds the stationary die block. The Waterbury-Farrel machines do not have such tie bars but depend entirely on the rigidity of the machine frames to limit deflection.

With the latter type of machine, deflection of the stationary dies varies with the resistance of penetration of the dies into the blanks as they proceed along the die faces. Accordingly the dies in Waterbury-Farrel machines must be set up with their top edges closer together as a means of deflection compensation.

In order that the screw pitch diameter may have no taper, the vertical inclination of the die faces must be such that they will spring apart, to a parallel position, when the blank has reached a point in traversing the die faces, such that the deflection of the stationary die block has reached the maximum, and the faces of the dies are vertically parallel. To accomplish this, some skill and experience is required on the part of the operator.

The point of maximum deflection is ahead of the leave-off point, which accounts for the considerable elastic recovery of the machine when the blank leaves the dies. If flat dies are not relieved at the leave-off end, an amount equal to or greater than the elastic recovery of the machine frame, the end of the stationary die will cause a very pronounced mark along the screw threads in the plane of the axis of the screw. Furthermore, the relief or drop-off must be quite gradual. Too sudden relief causes a flat on one side of the screw in place of the axial mark, producing noncircularity or out-of-roundness. Round die thread rollers are not subject to these characteristics. The drop-off or relief should extend uniformly across the face of flat dies and can be from one third to one fourth of the pitch circumference of the screw, or about equal to the pitch diameter in length.

Axial marks or seams on screw threads are also sometimes caused by improper starting radii on flat dies. The cause of axial disfiguration can easily be determined by backing a screw out of the machine before it has reached the leave-off point. Slight variation in blank diameters causes variation in machine deflection, particularly when the dies are set to be completely filled, that is, to roll down the crest ridges on the screws. Since the dies do not spread apart with a parallel motion, but as though they were hinged at a point below the machine, it is difficult to hold to close pitch diameter tolerances completely free of taper. For this reason, and also because of the very great increase in die stress occasioned by rolling down the crest ridges, with corresponding shortening of die life, it is preferred practice to so adjust the dies that the maximum diameter blanks just barely fill the dies and only partially flatten the crest ridges. In this way, variation in machine deflection between blanks is reduced and die life is increased.

Tie bars so effectively reduce machine deflection that the die profiles must be tapered down to spread out or flatten the peak penetration forces. This tapered relief usually extends along the first two threads of the length of the die faces. Both dies must be so relieved. Flat faced dies can be used in Waterbury-Farrel machines only because these machines are free to deflect sufficiently to relieve the otherwise extreme stresses developed by plunging to near full thread depth in the first few work turns. Boltmaker die pockets are relatively narrow, that is, recessed only for comparatively thin dies. Therefore, there is no danger of installing the thicker Waterbury-Farrel type of dies in National Boltmakers.

The tie bars used on Boltmakers so effectively reduce elastic recovery of the machine that the length of the drop-off radii can be about half of that recommended for Waterbury-Farrel dies, with a resulting slight increase in the available active work turns. Although Waterbury-Farrel dies cannot be used in Boltmakers, even though the die pockets accommodated them, Boltmaker or tapered dies work extremely well in Waterbury-Farrel machines.

Noncircularity of Blanks

Noncircularity of finished screws falls into two categories. One class has an even and the other an odd number of sides when viewed axially. A three-sided figure as shown in fig. 2 has, it will be noted, a constant diameter regardless of which direction it is measured. This characteristic is not limited to three-sided figures but can be true of those having five sides, as shown in fig. 3, and in fact any figure having an odd number of sides.

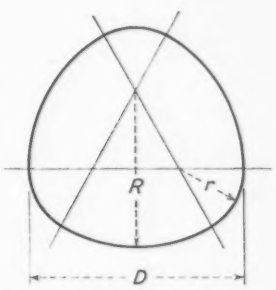


FIG. 2 — Noncircularity can cause considerable trouble in thread rolling, and cannot be detected by snap gage or micrometer measurement. As shown here, a three-sided figure may have a constant diameter D composed of R+r.

The points of contact between a pair of flat dies and the blank must necessarily be very nearly diametrically opposite at all times except when the blanks are on the starting radius. Therefore, flat dies have no tendency to round up blanks having an odd number of sides, and even pass blanks having a considerable degree of noncircularity.

To determine the ability of flat dies to round up noncircular blanks, a quantity was carefully made having a cross-section as illustrated in fig. 2. These blanks were ground to a constant diameter of 0.450 in. to receive ½ in. 13 threads. When mounted on centers and viewed in an optical projector, rotation of the blank caused a rise and fall of 0.0095 in. These blanks were then hand fed between flat dies and a very good thread was rolled thereon. After threading the rise and fall was 0.0088 in. The slight correction of 0.0007 in. was primarily due to the effect of the difference in degree of curvature of opposing sides of the blanks, and hence length of the arc of engagement with the dies. In other words, the die threads simply pressed more deeply into the portion of the blank having the smaller degree of curvature.

This same condition exists when four round dies are used, equally spaced around the axis of the blanks. Any figure having an odd number of sides and a constant diameter will continue to roll between such a die arrangement unchanged and without correction. In such a case the points of contact between dies and work are still diametrically opposite, the same as with a pair of flat dies.

When three round dies are equally spaced about the work axis, they will roll without circularity correction, figures having any even number of sides, such as a two-sided figure approximating an ellipse, four-sided figures, and so on.

In retrospect, if the number of equally spaced points of contact between dies and work is even, the dies will

correct a noncircular figure having an even number of sides, but will not correct a figure having an odd number of sides. Conversely if the number of equally spaced contacts is odd, the dies will correct a figure having an odd, but not even, number of sides. A further stipulation for rounding up the blanks is that the dies must converge, and only during convergence can the corrective process continue.

Correction for noncircularity is considerably accelerated by departing from equal spacing of die and work contact and adoption of incommensurable contact angles. This brings into play the corrective effect well known to centerless grinding, where the work axis is either above or below the plane of the axis of the grinding and regulating wheels.

This is one of the principal features of the Watson-Flagg and Steinle centerless thread rollers. Work of a high degree of precision regarding circularity has been done with these machines.

Noncircular blanks having an even number of sides can be corrected by blank rolling between flat plates, instead of dies, in flat die machines. Noncircular blanks having an odd number of sides cannot be rounded up in this way.

The basic nature of the thread rolling process involves a tendency to noncircularity of the work. Fig. 4 illustrates the elliptical cross-section imparted to the work by a pair of dies when an excessive rate of penetration causes them to reach full depth in about one third of a work turn. The points of contact between dies and work describe spiral paths, and with normal penetration rates the spiral paths are more nearly as indicated in fig. 5, where full depth is reached in two work turns. It will be noticed in the latter case that there is less distinction between the two spiral paths, resulting from reduced penetration rates, and consequently the work is more nearly circular at all stages of the thread formation. Extremely accurate threads can be rolled when the penetration rate is reduced to a few thousandths per turn of the work. Greatly reduced penetration rates, easily available with round die machines, permit threads to be rolled on hollow parts such as spark plug shells or tubing ends, which could not be accomplished on flat die machines due to the relatively great collapsing forces incidental to rapid penetration. With any given relatively low penetration rate, three dies can reach full depth half again as quickly as two dies. The minimum penetrating force that can produce a rolled thread is that which barely exceeds the elastic limit of the material of which the work is composed, at the point of maximum resistance to penetration, which point is where the thread becomes fully formed. When these minimum penetrating forces exceed the collapsing resistance of hollow parts and threads must be rolled thereon, the use of internal supporting mandrels is resorted to.

When the work is positioned slightly above or below the plane of the axes of two circular dies, the rounding tendency, similar to the action of centerless grinders,[1] is greater than the tendency of the thread rolling process to cause noncircularity.

[1] *See "Centerless Grinding," by G. F. Heckman, Tool Engineer, September* 1942.

Lacking adequate precision thread rolling capacity during the war for aircraft studs and countless other parts, the expediency of centerless grinding the blanks, before rolling on flat die machines, was resorted to. In this way the attributes of incommensurable angles, incidental to centerless grinding were achieved in at least part of the process.

Rolling Speeds

The surface speed with which thread rolling dies are operated has an important effect on die life, in terms of screws produced during the useful life of the die. The peak speed occurs at approximately the same point as the peak load. This peak surface speed is usually around 314 fpm. Any substantial increase in operating speed results in a departure from desired thread included angles on the work and very materially shortens the die life.

A 5-in. diam round die would rotate 240 rpm at a surface speed of 314 fpm. At this die speed a ⅜-in. diam screw would rotate about 3680 rpm about its own axis. It is, therefore, instantly apparent that round dies rotating with a continuous surface speed comparable to the peak speed of flat dies, accomplish 10 or

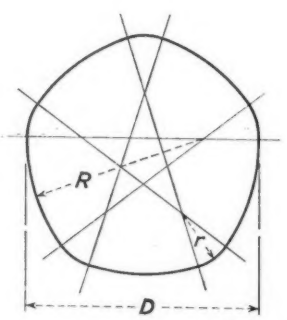


FIG. 3—The characteristic shown in fig. 2 is not restricted to three-sided figures, but can be true of those having five sides, as shown here, or any figure having an odd number of sides.

15 work turns in a very small fraction of a second. Round dies can by virtue of their constant speed of rotation maintain the same speed of blank rotation while operating at one third less surface speed than flat dies, with a resulting increase in die life. Furthermore, the useful circumference of a 5-in. diam round die is 15.7 in. The length of a Waterbury-Farrel No. 30 flat die is 7.5 in. (not all of which is completely active), which is less than half of the active surface of the 5-in. round die. There is much more equipment available for manufacturing round dies, in the way of cylindrical thread grinders than exists for the manufacture of flat dies of comparable accuracy and quality. Furthermore, heat treating distortion is more of a problem with flat dies, particularly thin dies, than with round ones. Flat die thread grinding equipment is available but it has not been developed to anywhere near the state of perfection of cylindrical thread grinders, except with one make of machines which is not being offered for sale. Round die machines are much more flexible regarding range of work diameters than flat die thread rollers. All of the new round die machines easily accommodate work diameters ranging from 5/16 to 1 in. and some of them even more.

One flat die machine for 1-in. diam work weighs 20,000 lb, which is very much more than another make of round die machine capable of rolling over 1 in. diam. Round die machines require far less floor space than flat die machines of comparable capacity. Change from the minimum to maximum work diameter is quickly accomplished with the round die machines. Automatic feeds are not practical having this range of work sizes. To overcome this objection it is necessary to so design the feeding mechanism and hopper that they embrace as wide a range of sizes as practical.

and be easily interchangeable with other feeders and hoppers that embrace other increments of the machine screw size range.

Earlier reference was made to thread rolling machines invented too soon. One of the most interesting and promising of these has a central continuously rotating round die surrounded by a pair of diametrically opposed internally threaded ring or segment dies. This type of machine is referred to as the planetary thread roller, because the screw blanks revolve in a planetary manner around the inner die. Such a machine is schematically illustrated in fig. 6 Regarding work size range and ability to round up the work, flat die and planetary machines are about on equal terms. Compared on a basis of size of work being rolled, the planetary type would be smaller and lighter. The base would be just about large enough to accommodate the motor. In appearance the planetary

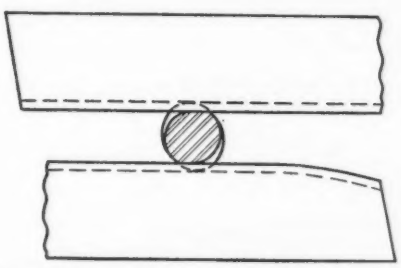


FIG. 4—A high degree of noncircularity may be imparted to blanks by excessive penetration to nearly full depth in about one-third work turn, as shown here.

machine would compare favorably with the Reed thread roller.

The outstanding important advantages of the planetary machine are several in number. At least four blanks can be simultaneously rolled. That is, four blanks are always in the machine. Each pair closely follows the preceding pair of blanks. Being introduced between the dies in diametrically opposed pairs, the blanks completely balance out the opposed radial penetrating forces on the inner die. Even at very low inner die speeds a very large productive capacity is realized, the quantity output being limited mainly by the rapidity with which the feeding pusher can oscillate in handling the blanks. The potential production is easily four times that of comparable sizes of flat die machines.

The construction is well adapted to include an adequate overload protection device to reduce the probability of accidental damage to the dies. A tie bar above and across the stationary dies, including an outboard bearing for the center die, would steady it in case the blanks are held up or run out on one side of the machine. The machine is more practical when designed with a vertical center spindle. In this way conditions for both sets of feeding hoppers and tracks are identical. Tracks can be located at the leave-off ends of the stationery dies to receive the threaded screws and carry them over the edge of the machine to be dropped into a tote box or similar handling means.

Planetary thread rolling machines are particularly well adapted for rolling taper pipe threads such that the apexes of the cones of revolution formed by the projections of the pitch lines meet at a common point which falls on the axis of the center spindle. In only

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FIG. 5 — The penetration paths of two dies is in the form of two interlocked spirals. This figure represents the paths of uniform penetration in two work turns.

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this way is it entirely practical to roll threads on blanks having a taper as steep as 3½°, or ¾ in. per ft. Since the inner die has six starts, the pitch line included angle of the die will be 6 x 3° 34 ft 54 in. or 21° 29 ft 24 in. Even with six starts the major pitch diameter of the die will be only slightly over 2¼ in.

The spindle of a two-die round die thread roller would have to be swung to an angle of about 25° with the other spindle to handle this work, the angle between spindles being the included angle of the dies plus the included angle of the work. So far as is known no machine is commercially available capable of rolling tapered threads even as steep as pipe threads on pitch cones having common apexes. Only in this way can the tendency of the work to overturn be minimized. Grease fittings constitute only a small part of the great amount of work that can be rolled to advantage on planetary machines, on a basis of common pitch cone apexes.

Another interesting form of thread roller was patented by R. Boeklin of New York City in 1873. This machine employs a centrally located round die whose axis is horizontal. Two internally threaded curved segmental dies are mounted above and at each side of the inner die as diagrammatically shown in fig. 7. The top ends of the stationary curved dies were spaced apart a distance sufficient to permit the blanks to drop between them, into engagement with the inner die which was caused to oscillate by a crank. In operation the inner die rolled a thread on blanks alternately under first one and then the other of the stationary segmental dies as the center die oscillated first in one direction and then the other.

In designing and developing thread rolling machines, deflection is far more important a consideration than elastic limit or yield strength. Excessive deflection

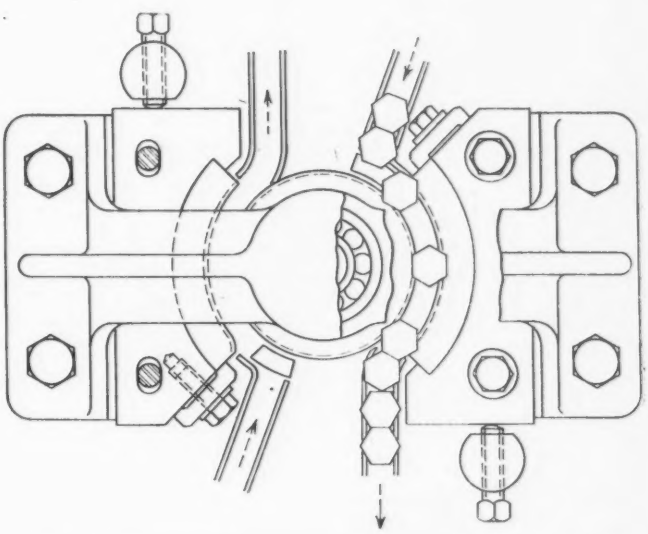

FIG. 6—Schematic illustration of one possible form of an ultra high production planetary thread rolling machine.

increases the difficulty and consequently time consumed in setting up the machine. Elements which deflect excessively have a much shorter fatigue life and must be replaced much more frequently. Minimizing deflection so the working stresses are equal to or less than the fatigue limit of the material of which the parts are composed will pay worthwhile dividends in minimizing maintenance costs. The endurance limit is usually far below the yield strength, particularly where stresses are completely reversed as with rotating shafts subjected to bending loads. The endurance limit can also be raised by reducing the range of stress fluctuations. For example, where the endurance limit for a spring may be 85,000 psi when the stress drops to zero at each cycle of operation, the same spring can be safely operated for an indefinite number of stress cycles at 100,000 psi if the minimum stress be 60,000 psi instead of being allowed to drop to zero. In other words, the endurance limit depends not alone on the degree of maximum stress but on whether the stress is undirectional or reversed, together with the magnitude of the range of stress between minimum or maximum.

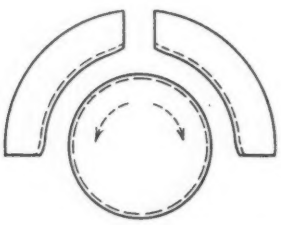

FIG. 7—Arrangement of the Boeklin thread rolling die invented in 1873. The center die is oscillated by means of a crank and connecting rod. Impractical originally because of the difficulty of making the segment dies, this could now be produced without difficulty.

The author will continue this discussion of thread rolling in the next issue.—Ed.

Oxygen Torch Speeds Blast Holes for Ore Mining

A NEW method of making vertical blast holes in hard, low-grade iron ore, called fusion piercing, has recently been tested on the Mesabi Iron Range. Increases in drilling speeds of 10 times that of older methods have been accomplished, according to Linde Air Products Co. In fusion piercing a flame, produced by burning oxygen and a flux-bearing fuel in a special blowpipe, is directed against the surface of the rock or ore. The high flame temperature, about 4000°F, causes some kinds of rock to spall or flake off. Flux in the fuel causes other kinds of rock to melt. Pressure of the burning gases forces the molten material past a water spray where it is quenched and broken up. In the quenching process water turns to steam and the steam helps the gases force the quenched material out of the hole, as shown in fig. 1. Fusion piercing is a patented process developed by Linde Air Products Co.

Equipment for commercial use is still in the development stage. For field tests a truck was equipped with a portable oilfield drill rig with the 30-ft special blowpipe replacing the "kelly," and pumps, tanks, motors, and special recording instruments. A more compact and less complicated commercial machine will result when the apparatus that is on the experimental rig solely for the purpose of collecting data is eliminated. It is expected that commercial machines will be operated by a full-time operator and a part-time helper.

Field tests were made on Minnesota "taconite," an extremely hard, tough, abrasive, low-grade iron ore. Holes up to 30 ft deep and 6-in. diam (see fig. 2) were fusion pierced at an average rate of 10 ft per hr, with rates as high as 17 ft per hr for short periods. This compares with an average speed of about 1 ft per hr for drilling holes of similar diameter in this ore. It was found, according to Linde, that the high temperature piercing flame produced stresses in the surrounding ore which cause better fragmentation during primary blasting.

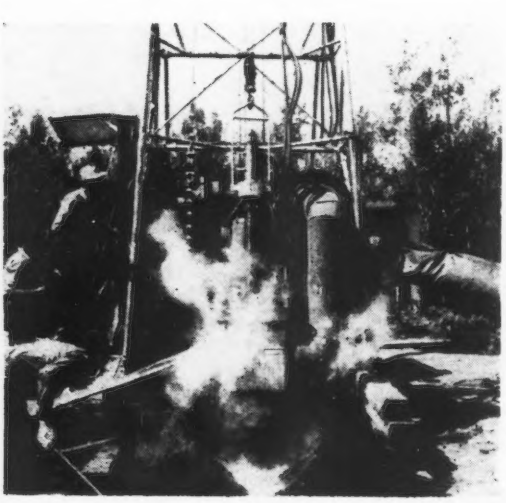

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FIG. 1 — A test run under way, showing the granulated slag around the blast hole. The blowpipe is approaching a full depth pierce.

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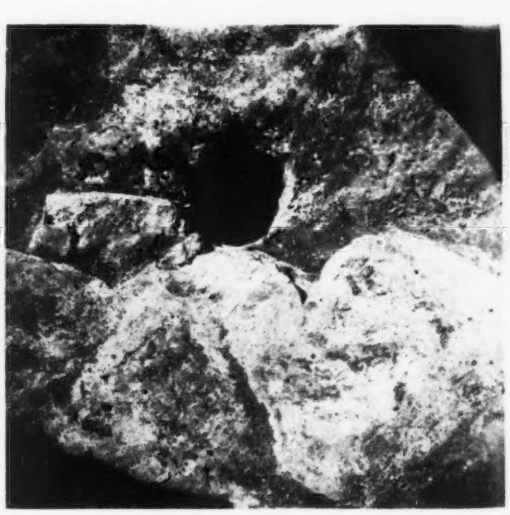
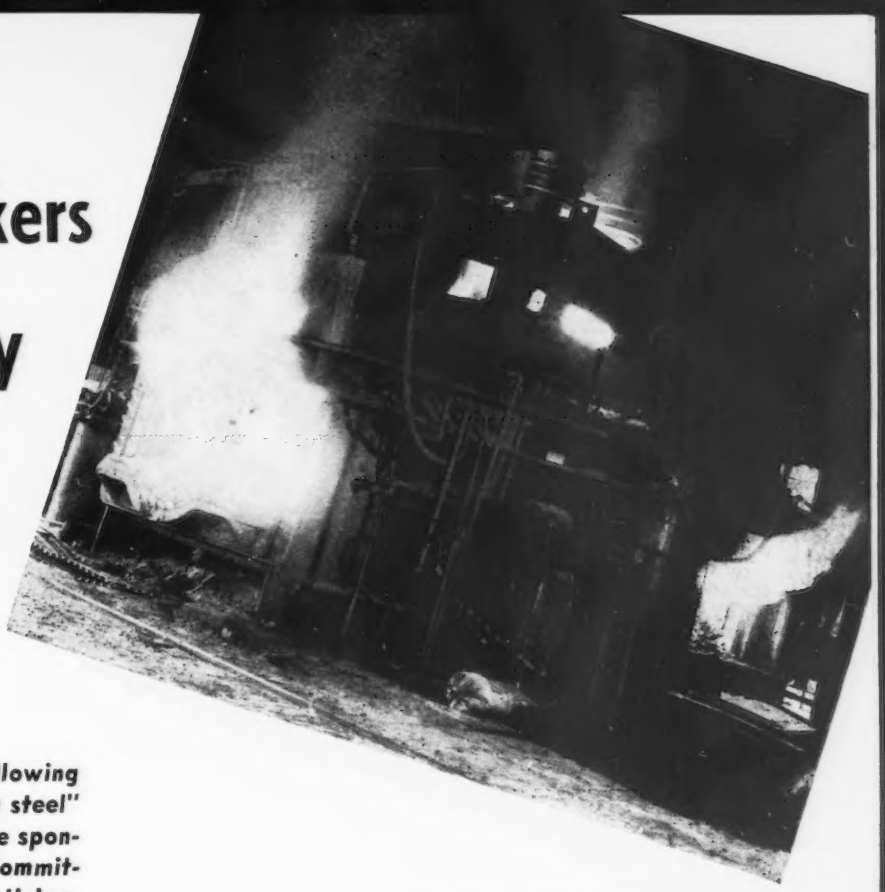
FIG. 2—A 30-ft blast hole of 6-in. diam produced by fusion piercing.



Electric Steelmakers Weigh Quality Factors



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Comprehensive technical program following the theme "production of high quality steel" features the Fourth Annual Conference sponsored by the Electric Furnace Steel Committee, AIME. Stimulating audience participation highlights technical sessions.

SOME 520 electric furnace melters, superintendents and metallurgists were welcomed to the fourth annual conference by W. J. Reagan, chairman, Committee for the Fourth Annual Conference, and C. W. Briggs, chairman, Electric Furnace Steel Committee, AIME, in Pittsburgh, Dec. 5.

A well-planned technical program of 30 formal papers covering basic and acid electric furnace steelmaking, induction melting, scrap preparation and charging, as well as theoretical ramifications of furnace reactions was enthusiastically received by those in attendance.

A new feature was added to the 1946 conference in the form of an educational session intended primarily for melters, helpers, observers, young metallurgists and students. Following presentation of papers discussing the chemistry of acid and basic electric furnace processes, a panel of experts was on hand to answer questions.

The annual dinner, at which W. H. Colvin, Jr., president, Crucible Steel Co. of America, served as toastmaster, was highlighted by the rapid-fire delivery of J. L. Rumble, general manager, Retail Truck Branch, General Motors of Canada, Ltd., who was guest speaker. Several of the technical sessions are briefly reviewed in the following text.

The technical program was initiated Thursday morning with a joint session of acid and basic-steel men, wherein progress made in "Carbon and Graphite Electric Furnace Electrodes" was reported by T. L. Nelson, manager, Electrode Service Engineering Dept., National Carbon Co., Inc., Niagara Falls, N. Y. Mr. Nelson pointed out that the technique of manufacture of electrodes has now advanced so that electrodes are available in sizes larger than any required for the largest existing electric steel furnace, and when larger furnaces are built, 24- and 30-in. diam graphite electrodes will be ready for them. The author also presented data on the effect that as of January 1946, there were 784 direct-arc electric steel and iron furnaces in the United States. This total includes 183 for producing basic ingot steel, 2 for acid ingot steel, 116 for basic steel castings, 365 for acid steel castings and 118 for melting iron.

After discussing in detail the advantages and disadvantages of using electrodes with larger diameters, Mr. Nelson summarized with the general observation that "the smallest diameter should be used that will safely carry the amount of power required to permit a maximum rate of production without excessive consumption of electrodes due either to overheating (oxidation) or to breakage."

Extensive tests conducted by National Carbon Co., indicated distinct advantages in the use of graphite nipples for carbon electrodes, including higher mechanical strength at the joint, higher electrical conductivity, lower thermal expansion of the nipple, and readied machinability of the nipple to close tolerances. The strength advantage appears to be approximately 50 pct greater, while the electrical advantage is about 185 pct more, in terms of joint conductivity. The higher cost, however, has held the graphite nipple to limited usage during the past years.

Another subject of mutual interest to both acid and basic steel operators, "The Mechanism of the Carbon-Oxygen Reaction in Steelmaking," was discussed by C. E. Sims, supervising metallurgist, Battelle Memorial Institute, Columbus. The purpose of the paper was to correlate actual melting practice with the science of the mechanics and mathematics of chemical reactions, commonly referred to as physical chemistry.

The principal reactions taking place in electric furnace practice are best illustrated by fig. 1, which diagrams the heterogeneous, three phase system of atmosphere, slag, and metal. Briefly, oxygen enters the bath

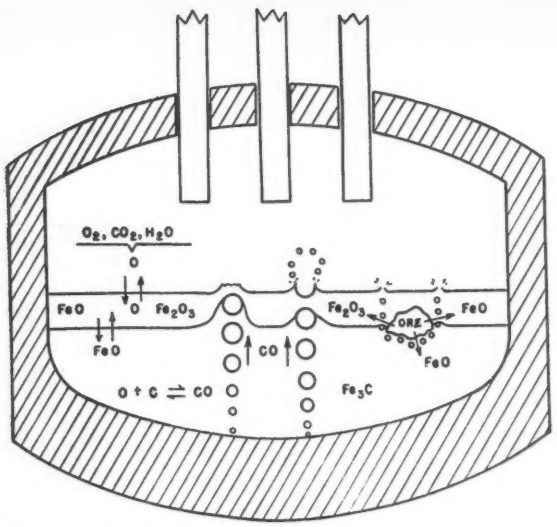


FIG. 1—Schematic sketch diagramming carbon-oxygen reaction in the electric furnace.

from the atmosphere by way of the slag, or from iron directly and by way of the bath. The carbon monoxide formed by reaction is precipitated at the hearth first, and then on the bubbles as they rise.

Substantiating theoretical aspects with operating data whenever possible, the author explored the nature of chemical equilibrium, activity phenomena, and bubble formation, in an interesting and educational manner.

Basic Practice

In a paper entitled "Preparation of Raw Materials for Fast Melting in an Electric Arc Furnace" S. D. Gladding, superintendent, Alloy and Tool Steel Div., Bethlehem Steel Co., Bethlehem, Pa., emphasized the importance (particularly in the production of constructional steels) of preparation, segregation and charging of scrap, as one of the primary requirements for efficient and economical operation of large basic arc furnaces.

Preparation is of paramount importance because so much of the scrap now available is unfit for direct melting, the author stressed. It is also of considerable economic consequence, since upgrading of low-grade scrap may make possible appreciable savings in scrap charges. Further, since scrap yard labor is cheaper than furnace labor, any scrap preparation capable of reducing the time of heats should reduce ingot cost.

Supplementing his presentation with color slides, Mr. Gladding outlined a procedure for scrap charging to obtain greatest thermal efficiency with least harmful effect on furnace refractories.

The interesting application of the basic electric arc furnace to producing openhearth type steels was illustrated by R. J. McCurdy, Supt., and R. W. Farley, Tilter and Electric Furnace Dept., Republic Steel Corp., Chicago, who reported the melting of semi-killed steel, and A. K. Moore[1], superintendent, openhearths, Steel Co. of Canada, Ltd., Hamilton, Ontario, who discussed the melting of rimmed steel.

* *See* THE IRON AGE, *Sept.* 26, 1946, *p.* 62.

The 74 heats melted at Republic Steel showed a higher cost per net ton of ingots when using the basic electric furnace as compared with basic openhearth ingots made in the same melt shop. However, the authors visualized a reduction in the differential with the possibilities of lowering initial power costs and increasing charging and melting rates, with the resultant higher tons per hour output.

Mr. Moore pointed out that at Steel Co. of Canada the higher costs of fuel and labor for the electric furnace were offset by the lower charge cost (scrap underselling pig iron) plus cheaper repair costs plus higher yield. This plant is located in a district that affords cheap electric power.

Comparing output of the electric furnace (70 tons) with openhearths of 100 tons, Mr. Moore stated that for heats containing more than 0.10 pct C, the yield for the electric furnace was 93 pct, while the openhearth yield was 88 pct; for heats containing less than 0.10 pct C, electric furnace yield was 92.8 as compared with 87.8 pct for the openhearth.

These two papers touched off a surprisingly spirited

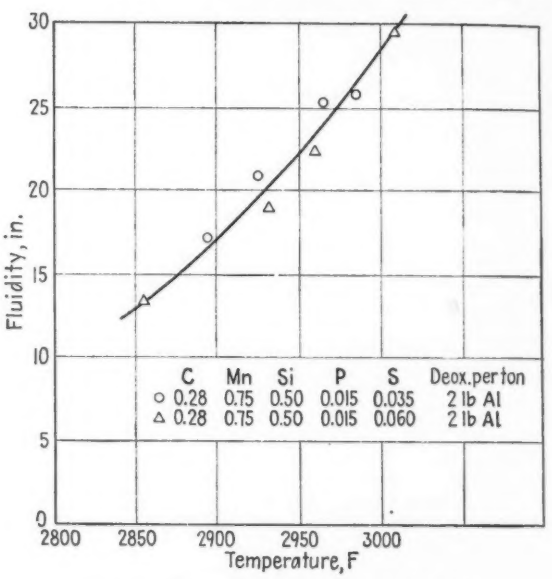


FIG. 2—Effect of sulfur content on fluidity.

discussion. in view of the fact that the general concensus of opinion (privately obtained) among operators was that the use of the basic electric furnace in producing rimmed and semi-killed carbon steels was only a temporary expedient and would be halted as soon as openhearth capacity overcame the heavy backlog of orders now confronting it.

H. E. Phelps, electric furnace superintendent, Rotary Electric Steel Co., Detroit, indicated that he used more lime than did Mr. Moore—he used about 70 lb per ton steel. The resulting high lime:silica ratio (3 to 3.5:1) in a large volume of highly oxidizing (20 pct FeO) slag, did an excellent job in sulfur removal.

Acid Practice

Evaluating quantitatively the various effects of sulfur on characteristics of steel castings, G. A. Lillieqvist, research director, American Steel Foundries, Indiana Harbor Works, East Chicago, Ind., presented a paper entitled "Effect of Sulfur in Cast Steel," before the acid steel group.

The speaker pointed out that sulfur exerts a great influence on the final physical properties of the castings by the important part it plays in the formation of inclusions. The shape of the sulphide inclusions in solid steel is controlled by the iron oxide content of the molten steel. When the iron oxide of the steel is high, the sulphides precipitate in a round form (type I) and do not harm the ductility of the steel. However,

when aluminum is added until the iron oxide content of the steel is reduced to a minimum, without leaving an excess of aluminum, the sulphide inclusions precipitate as a eutectic or stringers in the grain boundaries (type II). In this case, the steel will have low ductility. When the aluminum addition is increased so that sufficient residual aluminum is present, the inclusion type changes to the crystalline or irregular form (type III), and produces the maximum ductility in aluminum-killed steels.

A series of spiral fluidity tests was poured to determine the effect of sulfur on fluidity. The results of the tests plotted in fig. 2, indicate very little difference in fluidity between the high and low sulfur steels.

In considering the effect of sulfur content on external hot tears, the author presented data illustrating the marked decrease in tensile strength and elongation of steel at the temperature of hot-tear formation, about 2400°F. This reduction in properties was held sufficient to reduce the strength to a level below the stress condition of the steel, and hence rupture occurred more easily. The author found that a casting with crystalline inclusions (type III) was more resistant to hot tearing than a similar casting with round or eutectic inclusions.

The use of the slag-fluidity test as a control guide in both acid openhearth and acid electric heats was

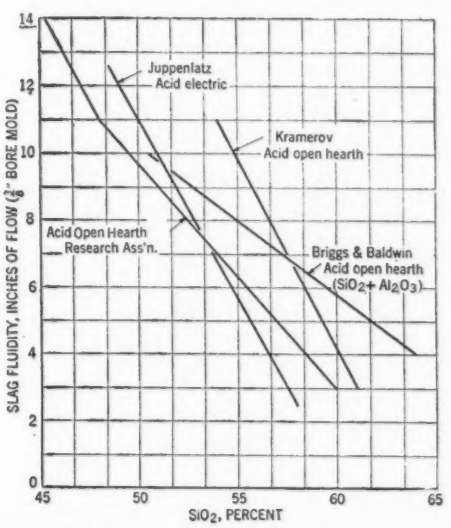


FIG. 3—Relation of slag fluidity to SiO_2 content of slag.

proposed by G. R. Fitterer, professor and head, Metallurgical Engineering Dept., University of Pittsburgh, Pittsburgh, in his paper "Acid Electric Slags."

The author presented a graphic log of an acid openhearth heat with a low metalloid charge which indicated that as the heat progressed from meltdown with a fair rate of carbon elimination, corresponding changes were taking place in the slag. The iron oxide content of the slag decreased with a proportional increase in SiO_2 content and these changes in slag composition caused a marked decrease in slag fluidity.

Illustrating the relationship of slag fluidity to SiO_2 content of slag and FeO content of slag, figs. 3 and 4, and temperatures of metal, the author pointed out the good general agreement in reports of the various investigators. Equally important is the fact that the rate of carbon drop in the bath is directly dependent upon the rate of decrease of FeO in the slag, and hence, upon the rate of change in slag fluidity. One should be able to determine the trend of the heat (rate of carbon drop) from changes in the slag fluidity. Usually in acid openhearth low carbon heats, 1 in. decrease in slag fluidity corresponds to an average decrease of from 0.04 to 0.06 pct C.

Based on the fact that the acid electric slag shows similar reactions to the acid openhearth slags (figs 3 and 4) with respect to fluidity, temperature and analysis may be taken as adequate indication that fluidity may be used as a control guide in acid electric heats. This is already being done in some plants and is standard practice in acid openhearth shops.

Induction furnace melting as applied to the manufacture of high alloy casting, particularly heat-resisting and corrosion-resisting alloys, was described by R. J. Wilcox, chief metallurgist, Michigan Steel Castings Co., Detroit. The speaker summarized the advantages of this type of melting as follows:

(1) Ease of chemical control, in that the recovery of elements can be anticipated within close limits.

(2) As compared with arc furnace practice, recovery of oxidizable alloys is very high in the induction furnace.

(3) Larger quantities of alloy scrap can usually be used in induction melting as compared to arc furnace practice.

(4) Due to the relatively small size of these units, they are extremely flexible from the standpoint of providing a supply of different analysis metals at relatively frequent intervals.

(5) Control of temperature within close limits can be obtained during the entire pouring operation of a heat.

The disadvantages of induction melting were indicated as follows:

(1) As compared with the larger arc units, melting labor cost is higher per ton of metal melted.

(2) Analytical costs are high due to the relatively small size and greater number of heats.

(3) Refractory costs are nearly twice as high as compared to acid arc furnace melting, while power costs are about 10 pct higher.

(4) Pouring is less flexible from the induction furnace as compared to the use of a bull ladle from the arc furnace.

(4) Scrap preparation costs are higher for induction melting since it is necessary that most of the scrap be relatively small in size.

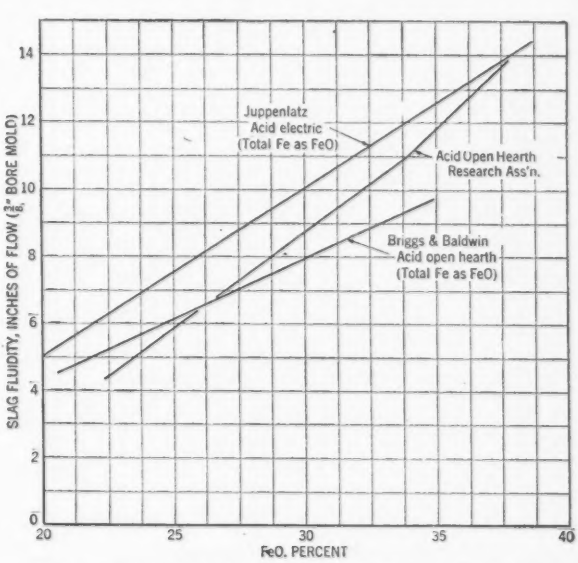
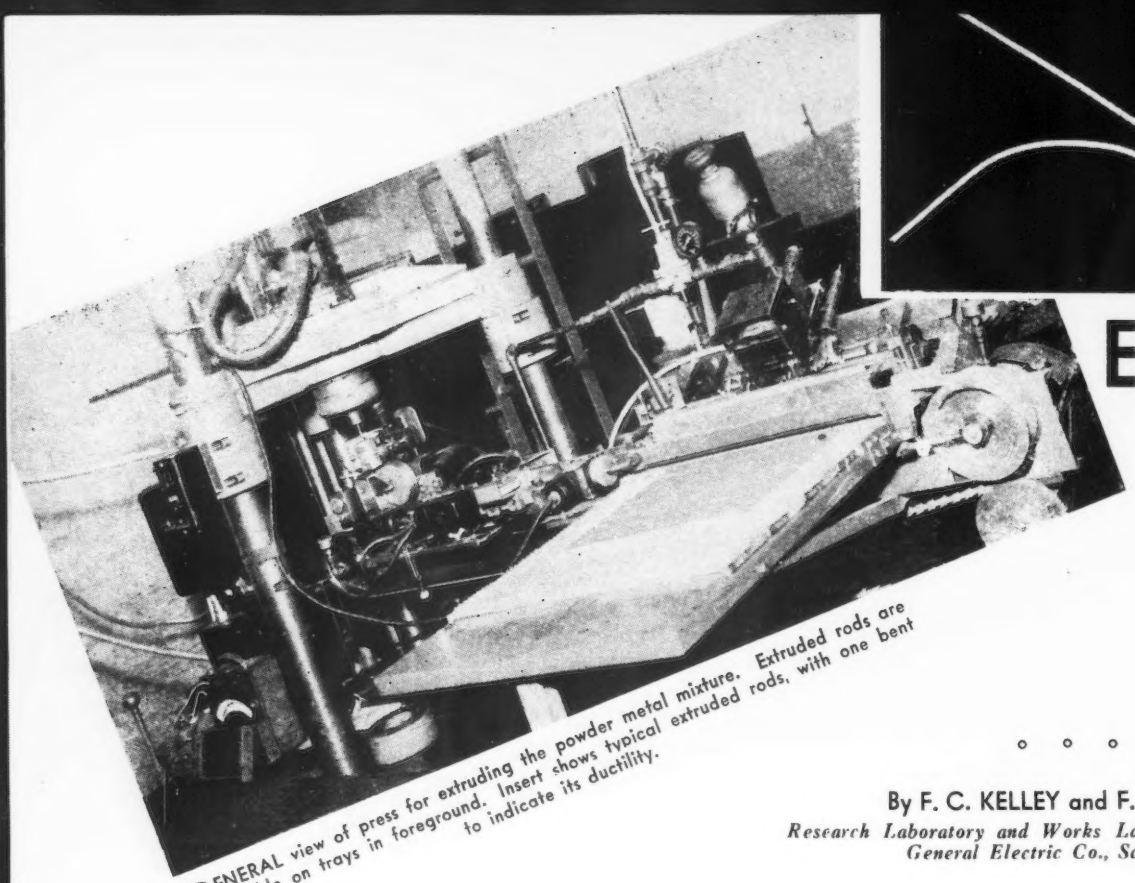


FIG. 4—Relation of slag fluidity to FeO content of slag.



GENERAL view of press for extruding the powder metal mixture. Extruded rods are visible on trays in foreground. Insert shows typical extruded rods, with one bent to indicate its ductility.

Extruded Po

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By F. C. KELLEY and F. E. FISHER

Research Laboratory and Works Laboratory, respectively, General Electric Co., Schenectady

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THE great demand, during the war, for welding rod material, particularly for the 18 Cr-8 Ni type, taxed existing wire drawing capacity to the limit. In an effort to relieve this situation, the idea was conceived here that 18-8 rods might be produced by combining powder metallurgy and extrusion.

After considerable experimental work, an extruded powdered metal rod was produced at this plant which fulfills all welding requirements as well as wrought rods and which possesses some very desirable arcing characteristics. The present cost of this extruded rod, however, is too high to compete with other rod production methods.

When this project was originally undertaken, no equipment of the required type was available so a machine was built to do the job. An old press used by the refrigerator department was stripped of unnecessary equipment, rebuilt and remodeled for the continuous extrusion of 18-8 welding rods using metal powders.

The preliminary work was done with a machine which consisted of the frame, a hydraulic pump and motor which operated the plunger, a vertical loading cylinder and an attached nozzle. The extruded material was caught on 30-in. long grooved wooden trays moved by hand at right angles to the direction of extrusion. The rods were cut off at the nozzle by hand, using a small spatula. Later the machine was completed to operate automatically.

In the first runs, starch was cooked in a double boiler. The dry starch was weighed before the addition of the water solution. After cooking, the mixture was weighed again to determine the amount of starch per unit weight of the cooked mass. A weighed amount of cooked starch, equivalent to the desired amount of dry starch, was added to hydrogen-reduced iron in an evaporating dish and worked together by means of a spatula. The mixture was then transferred to a mechanical mixer and remixed thoroughly.

This method did not give the uniform distribution of starch desired and, upon mixing, too much heat was generated, so another technique was investigated. This time the desired amount of dry starch was mixed with the iron powder by milling and then the required amount of water solution was added to the iron in an evaporating dish. The mixture was then transferred to a double boiler and cooked. After cooling to room temperature, it was transferred to a refrigerator and allowed to age for several hours or over night in a covered dish.

After aging, the moisture left the surface of the plastic mass, resulting in a thin dry film on the surface. In order to restore the moisture to this film, the whole mass was put into a mechanical mixer and remixed. This mechanical mixing also increased plasticity enormously.

The mass was then packed into a cylindrical form of such dimensions that, when the mixture was removed, it would just slide into the extrusion cylinder. The charge was inserted into the cylinder, the plunger lowered, and the extruded plastic rod was caught on a grooved wooden tray as it emerged from the nozzle. The rod was quickly cut at the nozzle when long enough to fill the groove. This operation was continued until the plunger reached the bottom of the stroke and all of the material was forced through the nozzle.

Some Observations on Extruded Powders

The first extrusion nozzle used in this work was held in an adapter ring which in turn was attached to the

Powder Metal Welding Rods • • •

A warborn technique for producing 18-8 welding rods by extruding a powder metal mixture, which resulted in a rod having very satisfactory welding characteristics and featured metal deposition in the form of a fine spray, is described for the first time.

o o o

end of the extrusion cylinder by means of a threaded and knurled union. The joints between the nozzle and adapter ring and the adapter and the cylinder were not smooth and continuous. The surface of the ring leading to the nozzle opening made only a slight angle with the horizontal. The poor joints resulted in a rough surface on the rods and the slight slope on the adapter ring caused the formation of a hard cake in the bottom of the cylinder and in the nozzle. It was necessary to remove the cake from the cylinder and nozzle before the next charge could be extruded, preventing continuous operation.

The deformation of the plastic charge as it passed over the joints either trapped some small amount of air, or did not travel far enough to smooth up the extruded rod, or both. The plunger as it came down on the charge compressed it at the top, squeezing moisture and starch from the charge nearest the plunger into the mass below. It was observed that the first part of the extruded material to emerge was quite moist and would stick to the trays, while towards the end of the operation the material was quite dry and would break at intervals, giving short lengths. Near the end of the stroke the extrusion pressure would sometimes increase to a point where there was danger of wrecking the press, and the plunger would have to be withdrawn from the cylinder and the hard cake removed. This happened, however, only when the starch content was too low or when the slope leading to the nozzle was not sufficient.

It was found that different types of powders required different amounts of starch to insure complete extrusion from the cylinder and the elimination of the objectionable hard cake. It was thought at one stage of the development that the particle size determined the thickness of the cake left in the cylinder, but subsequent modifications proved that this was not the truth. Carbonyl iron composed of very fine spherical particles extruded very nicely and required less starch than electrolytic iron composed of solid irregular particles of larger size.

These observations led to the elimination of the adapter ring of slight slope and the rough joints. Three nozzles were made, each from a solid piece of die steel, having different slopes leading to the outlet of the nozzle. The nozzles were machined to make perfect joints with the inner cylinder wall and were held in place by means of a threaded and knurled union. These nozzles gave much better performance than the previous assembly, eliminating the rough surface on the extruded rod. However, there was still some tendency to form a solid cake, but to a much less degree.

For the 18-8 mixture, several modified compositions were tried, but the one that appeared most interesting had the following composition:

	Composition of Mixture, Pct
246.0 g low carbon ferrochrome (6948 pct Cr)	19.0 Cr
81.0 g electrolytic Ni	9.0 Ni
4.5 g electrolytic Mn	0.5 Mn
2.5 g Si + 2.07 g Si in the ferrochrome (0.84 pct)	0.5 Si
566.0 g annealed electrolytic iron	71.0 Fe

The dry starch was added to this mixture and the desired amount of water solution as described previously. It was cooked, aged and extruded into rods. The rods, after extrusion, were very flexible. The 30-in. lengths could be supported without breaking or elongating when held up by the ends and could be handled easily without breakage.

Removal of Water Solution

The rods were cut to 15-in. lengths and placed in grooved steel trays which were placed in a steel tube. The steel tube in turn was placed in a Nichrome-wound tubular furnace with the ends protruding so that rubber stoppers could be used for closing the ends. One stopper was tubulated for evacuation. The furnace was heated to the temperature necessary to remove the solution. This temperature is important because the starch must not be broken down, or the rods will break upon handling. An effort was made to remove the solution by heating in a hydrogen atmosphere for 18 hr but all the solution could not be eliminated. After sintering the H_2-treated rods had too high a carbon content, an undesirable characteristic for 18-8 rods. After removal of the solution by heating in vacuum, the rods were sintered in pure dry H_2, having a dew point of below 105°F.

After the solution had been removed from the extruded rods in vacuum, the trays were transfererd to a

steel box (shown in fig. 1) which had been cleaned up by heating in hydrogen. The bottom of the box was covered very lightly with Al_2O_3 powder to prevent sticking of the grooved trays and the surfaces of the grooves were also dusted with Al_2O_3 to prevent sticking of the rods in the grooves. The grooved trays were stacked one on top of the other by means of spacers until the desired number of rods for the charge was obtained. The box was supplied with runners to hold it off from the furnace bottom. It also had a pipe welded to it which turned upward at the center of the box for a few inches and extended beyond the end of the tray. This pipe carried hydrogen into the container formed when a steel cover was dropped over the stacked rods in the box, and steel wool was tamped in between the sides of the box and the bottom edges of the cover to serve as a vent for the box. Such materials as Al_2O_3, powdered ferrochrome or ferrosilicon, may also be used for the same purpose. These materials also served to prevent diffusion of the furnace atmosphere into the box against too low a pressure of pure dry hydrogen.

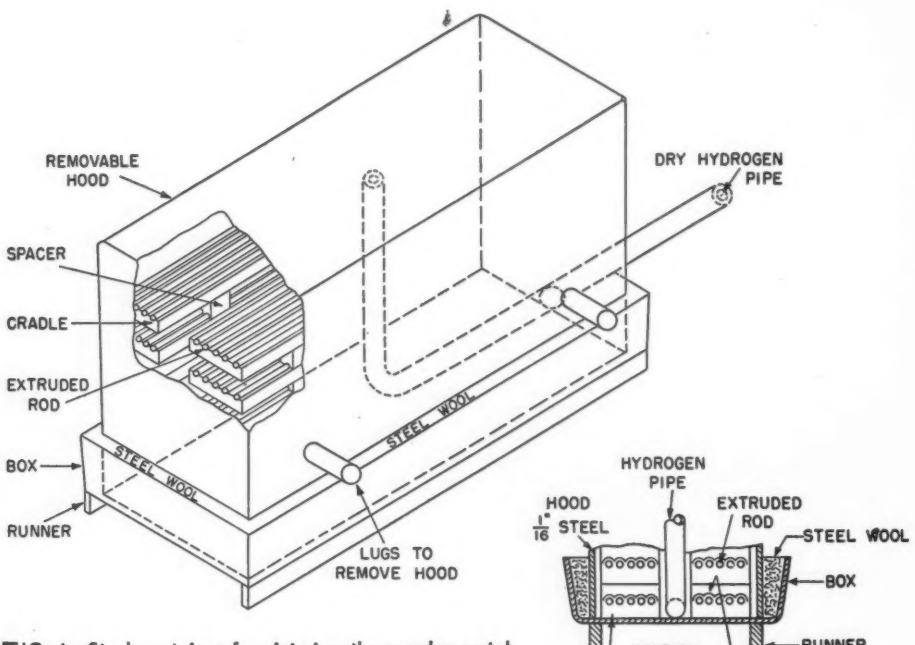

FIG. 1—Steel container for sintering the powder metal mix in a controlled atmosphere at 2900°F.

After the box had been sealed it was introduced into the cooling chamber of a high temperature, hydrogen furnace having molybdenum heating units, with the gate closed. An adapter to take the H_2 inlet pipe was put in place to close the end of the cooling chamber and the pipe was then connected to a source of pure dry hydrogen and the container washed free of air with a flow of 8 to 10 cu ft per hr of hydrogen.

The gate between the furnace and the cooling chamber was then opened and the container pushed into the 2370°F hot zone. The charge was held for 1 hr after it reached 2370°F and was then pulled into the cooling chamber by means of the hydrogen inlet pipe. The hydrogen flow was increased just before the container was pulled into the cooling chamber to make certain none of the furnace atmosphere was drawn into container by the sudden contraction of the hydrogen when the container hit the water-cooled chamber. This prevented oxidation of the rods and aided in cooling down the charge. After cooling, the container was removed from the cooling chamber and the cover removed. The rods could then be taken out of the trays. The rods when measured at this point showed a shrinkage from an original diameter of 0.225 in. to 0.200 to 0.204 in. They were bright and clean and quite ductile and could be bent through quite an angle without breaking. The carbon content varied from 0.05 to 0.09 pct. In order to bring the rods to 0.1875 in. diam a single pass through a swaging die was given. They were then trimmed to length, put through a standard coating machine and were ready for use.

As indicated previously, the rods shrunk about 0.025 in. in diam or 36 pct in cross-section area after sintering. After reduction by swaging to 0.1875 in. diam they were only about 75 pct of the density of wrought wire.

When the normal welding current of 175 amp was used on these rods, they ran very hot and it was found desirable to reduce the welding current to 150 mp. The rods exhibited very desirable arcing characteristics as the metal transfer was in the form of a fine metal spray instead of drop by drop as is the case with the standard wrought material. The deposited metal from the sintered electrodes had a very broad low meniscus while that from the wrought material was narrow and high. The weld made with the sintered rod was easily distinguished from that made with the wrought rod because the former was very smooth and broad while the latter was rough, rippled and narrow.

Carbon analyses were made on standard 18-8 rods, from 1 x 1 x 11 in. pressed, sintered and swaged 18-8 rods, and from extruded rods. The results were as follows:

Standard wrought	0.08 C
Pressed, sintered and swaged	not taken but low
Extruded	0.38 C (exceptionally high)

Deposits made from each of these materials were analyzed for carbon with the following results:

Standard wrought weld	0.07 C
Pressed, sintered and swaged weld	0.04 C
Extruded material weld	0.12 C

The standard and the pressed-sintered-swaged rods both gave the drop by drop transfer of the weld metal while the extruded rod (of exceptionally high carbon) gave the spray type of transfer. The carbon in the weld metal deposited with the first two wrought materials changed very little from that of the electrodes while the carbon in the weld metal deposited with the extruded rod having the spray type of arc was reduced 68 pct.

Strauss tests on welds made with all three types of rods showed no signs of corrosion even after 72 hr. Welds made with all three types of rods, sensitized in pure dry hydrogen at 1200°F for ½ hr and subjected to this same test, showed no signs of corrosion. Microscopic examination of polished specimens cut from these welds showed no difference in structure as is indicated in fig. 2. When the specimens were dropped on a solid plate all gave a clear metallic ring and bend tests revealed no brittleness. In spite of the rather high carbon content of the weld made with the exceptionally high carbon extruded rod, no distinction could be drawn between it and the welds made with the other two rods.

Parenthetically, it might be pointed out that the second wrought rod was made by pressing mixed powders in a mold, sintering at a high temperature for an extended time to bring about diffusion, and then hot swaged to bring about a wrought condition similar to that produced by melting, casting and working. This second rod was made for the purpose of comparison and to indicate another method which might be used to produce wrought rod material.

Since some trouble was experienced in extruding the entire charge from the cylinder without the formation of a thin cake, the problem of eliminating this trouble was investigated to facilitate the continuous operation of the automatic machine. Into one of the one-piece nozzles a cone making perfect contact with the inner walls of the nozzle was introduced. It was made by casting Wood's metal directly into the nozzle. When the casting was removed from the nozzle, it was grooved and shaped as shown in fig. 3. This soft Wood's metal cone with the grooves in it eliminated all the solid cakes and made continuous operation possible. A hole was drilled through the nozzle and cone and a pin inserted to prevent the cone from being withdrawn when the plunger was raised out of the cylinder. The cone caused the plastic mass to break up into streams which flowed down through the several grooves in the cone. These streams united into a single mass again below the cone and just above the throat of the nozzle. The mouth of the nozzle was relieved slightly to allow for expansion of the

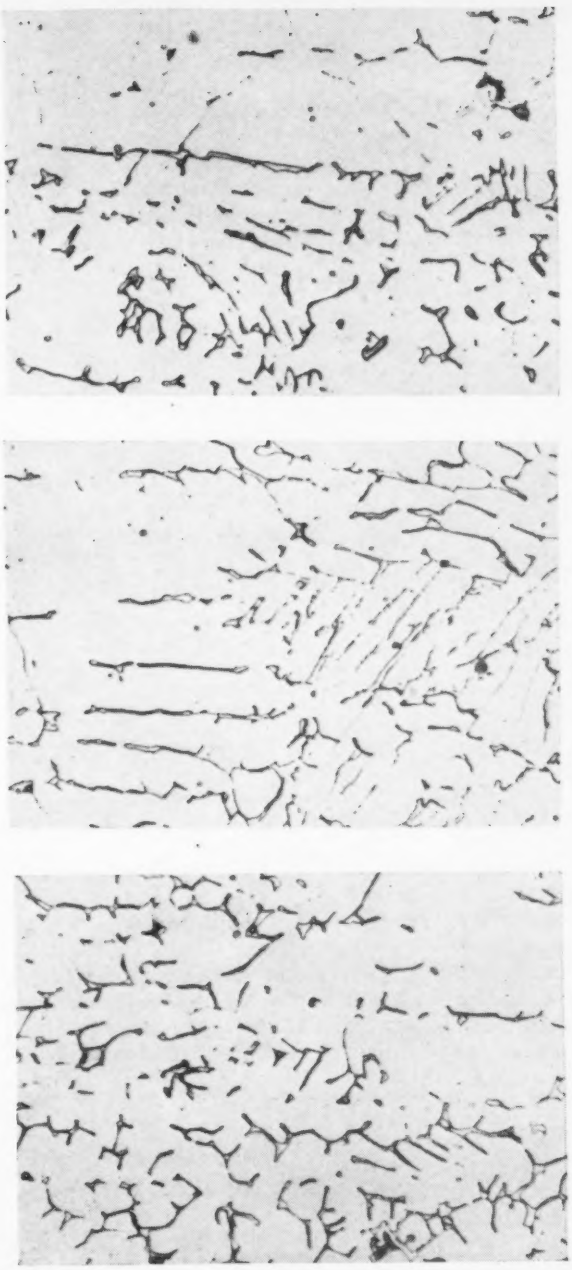

FIG. 2—Comparative structures of welds made with various types of 18-8 rods; top micro is a weld made by a standard 18-8 rod; center is from a sintered and swaged rod, while bottom illustration is of an extruded rod weld. All micros X500.

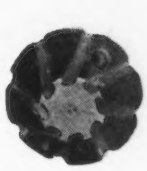

FIG. 3—Improved type of extrusion nozzle and throat cone.

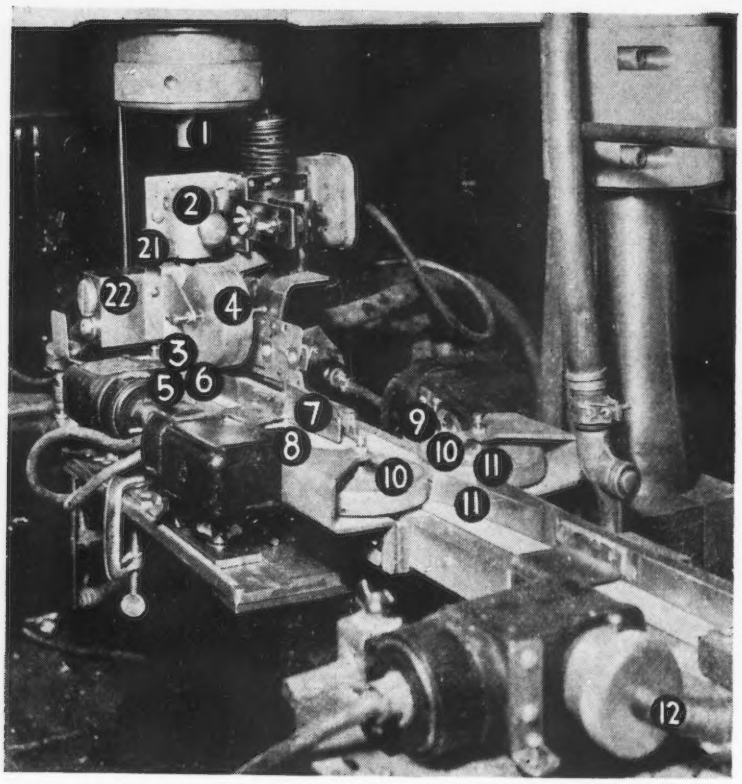

FIG. 4—Details of the extruding press. Reference numbers are explained in the text.

plastic mass as it emerged. The mixing action secured by splitting the charge into several streams appeared to be very beneficial and eliminated the cake-forming difficulty. The metal remaining in the bottom of the cylinder and in the nozzle could be left there for a week or more, if the plunger was allowed to remain in the cylinder during this time. When a new charge was inserted, the material could be extruded without first removing the old.

Details of the extruding are shown in figs. 4 and 5. Referring to fig. 4, part No. 1 is the extrusion nozzle held in the end of the charging cylinder by means of a knurled and threaded union, part 2 is a split cylinder which acts as a guide for the extruded material, while part 3 is a curved strip of metal which turns the end of the extruded material in the direction in which the endless belt is moving.

Part 4 (fig. 4) is a roller free to rotate on a shaft and part 5 is the housing for the light source activating a photoelectric cell which serves to regulate the speed of the conveyor belt so that the extruded material runs midway between parts 3 and 4. Part 6 is a continuous belt. Part 7 is a guide serving to keep the extruded material in the center of the belt and 8 is another housing of a light source. Part 9 is housing of a photoelectric cell. Part 10 is a pair of hollow rollers which rotate at twice the speed of the belt and serve to straighten the ends of the cut pieces as they ride along on the belt and part 11 is another pair of guides. Part 12 is a curved piece of quartz rod covered with tape and connected to a light source. It serves as a means of activating a photoelectric cell which controls the kicker mechanism. Part 21 is the cut-off knife and part 22 is a double acting compressed air cylinder actuating the knife.

A close-up view of the kicker mechanism which pushes the extruded rod from the belt into the grooved tray is shown in fig. 4. Part 13 (fig. 4) is a steel plate to which is clamped a piece of leather held close to the belt. This plate is actuated by a relay and serves as the kicker. Part 14 is another steel plate serving as a stop for the ejected rod and also as a guide to cause the rod to fall into the proper groove in the tray. Part 15 is a series of grooved trays.

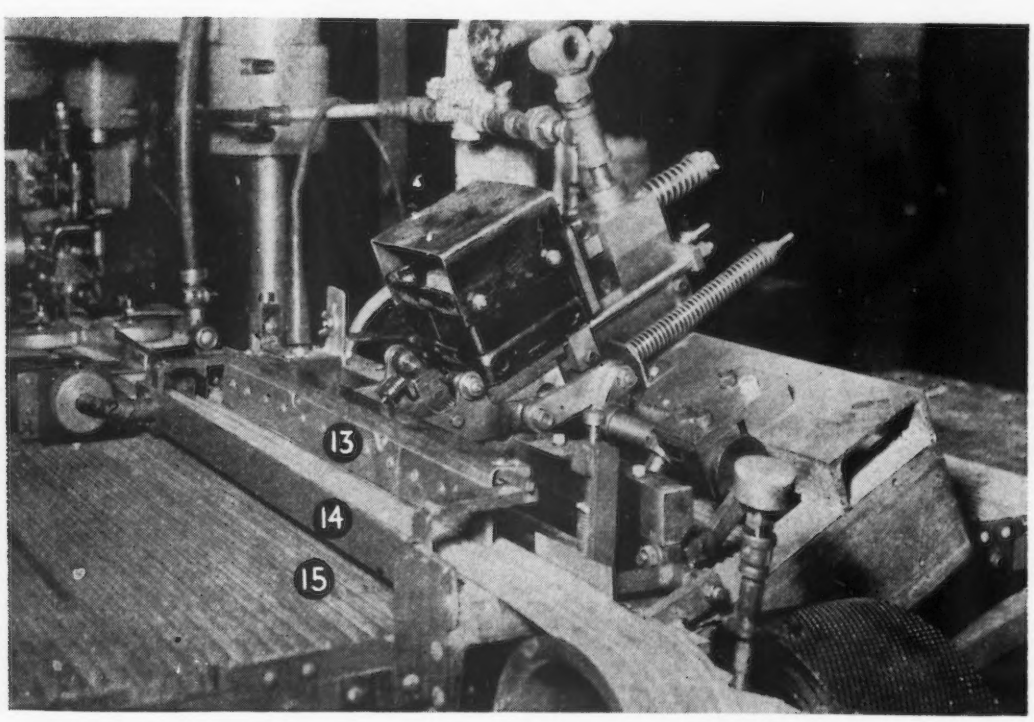

FIG. 5—Close-up of the conveying belt and kicker of the press, with receiving trays in the left foreground.

Planning A Plant Layout

The arrangement of machinery and equipment can either be an aid or deterrent to efficient plant operation. The optimum arrangement need not be limited to large plants employing a battery of plant layout engineers. In this article practical procedures suitable for any sized plant are specifically and simply outlined.

° ° °

By ROBERT SPURGIN, JR.
Richmond, Ind.

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PLANT layout is one of the important factors in the profitable operation of an industry. Too often the arrangement adopted is not developed to its fullest potentialities because of a lack of the type of records and facilities necessary to realize the best possible solution. The layout of departments and equipment affects:

Economy in use of space
Expansion possibilities
Flow of materials and processing
Supervision and control
Labor efficiency
Plant appearance

Considering the expenditures involved in buildings, the cost of setting up the equipment, and the direct influence on profits, the investment in effort and money required to obtain the best possible layout is well worth while.

The necessary setup for making a shop layout consists of the current layout, boards with movable templates; tracing of the current layout; extra set of movable templates (working set); small scale tracing of whole plants, showing arrangement of departments, and combination storage cabinet and reference table for layouts.

The first step in the procedure is the determination of the scale to be used. The common mistake of making it too small should be avoided. The scale ¼ in. equals 1 ft is satisfactory for the usual machine shop, but in plants where important machines are small, a larger scale should be used. The chief consideration is that the machine templates must be large enough for identifying markings and for easy handling. Ordinarily, the same scale is used throughout the plant, but if the small machines are confined to one or two small sections, these sections may be detailed on a larger scale than the rest of the plant.

Once a scale has been selected, accurate floor area dimensions of buildings are obtained and recorded on rough sketches. These sketches should show the inside line of walls, location and size of columns, doors, windows, floor plates, permanent piping, electrical switch panels and any other permanent building details or equipment that will affect occupancy of the floor. Load capacity and service range of overhead cranes are also recorded.

From these floor area dimensions, a small scale drawing of the plant is made on 8½x11 in. tracing paper. If the building is multiple storied, a separate sheet for each floor is used. This drawing shows no details except an outline of floor area and location of columns or, in the absence of columns, pilasters. Columns or pilasters mark the division of the building area into bays. The purposes of this small scale plan are threefold: (1) To establish a location plan for bays; (2) to divide the plant area to give suitable size layout sections, and (3) to serve as a basic layout for showing current and proposed occupancy of plant by departments.

A location plan for bays is next established. This is an important convenience in layout activity. A suitable plan is to designate each bay by a symbol consisting of a composite number made up of the building number, floor (shown as a letter, A for first floor, B for second, and so on, and Z for basement), and location of bay on the floor, consisting of two numbers separated by an x, the first representing the order of sequence from the west wall and the second the order of sequence from the north wall. For example, a bay in the building No. 5, second floor, third from west and sixth from north would be symbolized 5b3x6. The bay location data are placed on the small drawing.

Next is determined the best division of the plant into layout sections. Depending upon the size of the plant and the scale employed in the layout, the plant is divided for layout purposes into sections of such size that the layout sections will not exceed, say, 24x36 in. Dividing the layout into sections facilitates working on the layout and storage. The sections decided upon are outlined on the small drawing and each assigned a number, starting with one, for convenience in filing and reference. In dividing the plant area, it should be endeavored to make the dividing line in established passageways or at walls or, as a third choice, at bay

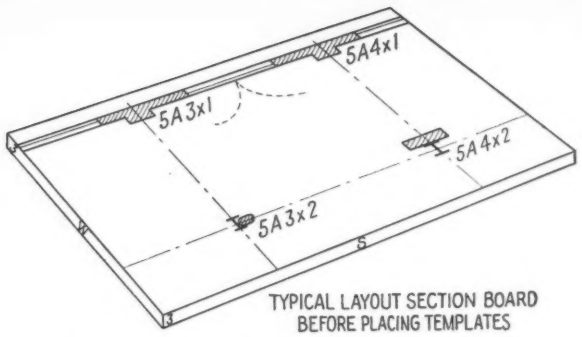


FIG. 1—Typical layout section board before the addition of templates.

lines; the object being to reduce the occasions when a machine will overlap from one section into another. A margin of 1 in. or greater is provided beyond the outside walls. It is not important that these sections be similar in size or shape, nor is it objectionable occasionally to indent one into the corner of another if it better serves the purpose of the layout.

The setup is now ready for layout section boards. After determination of the size of the layout sections, boards are made the exact size of the sections. For this purpose ¾-in. plywood is used. The top surface and edges of these boards should be sanded smooth. Smooth heavy drawing paper is now permanently mounted on the top surface of each section board. This is best accomplished by cutting the paper ⅛ in. larger than the outline of the board, creasing up (not sharply) about ⅝ in. back of edge, lightly and evenly moistening the bottom side of the paper with a sponge, within the crease lines, and then applying cold liquid glue to the bottom of the paper outside the crease lines and, when the glue becomes tacky, applying the paper to the board, leaving a small overhang for trim. The operation requires some care. When properly done, the paper will dry smooth and taut without splitting. When thoroughly dry, the overhanging paper is carefully cut off with a sharp knife.

The boards are now ready for drawing in the outlines and permanent details of the bays. This should be done accurately, using a sharp pencil and using the dimension detail previously obtained. Each of the ¾-in. edges of each board is marked in the middle with a letter N, S, E or W to indicate corresponding points of the compass, and to the left hand side with the layout section number. The location symbol of each bay is shown in its northwest corner (see fig. 1).

The boards now receive an allover coat of clear lacquer, preferably applied by spray gun. When dry, the top surface is lightly sanded with fine sandpaper to remove any slight roughness.

The boards, fitted together, make the floor plan of the entire plant. Storage, or filing facilities for the boards should be provided. Each should lie flat, separated from the others and protected from dust. A chest of shallow drawers well serves the purpose.

Paper templates are now made of the machines and other movable plant equipment. A prerequisite to this is that each machine be assigned a plant serial number for the purpose of identification and records. Ideally this number in ½-in. figures is carried on a stamped metal plate, which also carries the name or initial of the plant, affixed to the machine in a conspicuous position by drive screws. A series of such plates, stamped as desired, can be purchased from manufacturers of name plates. For the purpose of plant layout, this plate serves not only for identification but also as a register mark (or point) for accurately locating the machine on the floor.

Each piece of equipment is measured for the purpose of making templates. Dimensions may be recorded on rough sketches which will also carry the plant serial number, in the case of machines, or serial number of machine served, if any, in the case of auxiliary equipment. Also a brief descriptive name of the machine or equipment and any important feature that distinguishes it from others of the same general description are recorded.

Measurements should be taken from the center of the plant serial number plate. Useful equipment in taking measurements of a machine consists of a plumb and line, piece of chalk and 6-ft folding rule. The important points of the machine outline can be transferred to the floor, thus simplifying their measurement. Accuracy to within 1 in. is satisfactory.

In making and recording dimensions, a dimensioned sketch of the compact outline of the machine is made, avoiding the delineation of fine detail. The extreme space occupancy of movable parts when the machine is in operation is determined either by trial or calculation. This latter outline can be shown dotted in the sketch and, of course, dimensioned. In addition to outlines, location on the machine of wiring connections is shown, using an asterisk for this purpose. The approximate operating position of the workman is also indicated by a short heavy line inside the outline.

After the equipment in one department is measured, there are advantages in taking the data to the drawing board and making the layout templates, and then proceeding with their location on the layout board before starting another department.

This plant layout plan requires that four different colors of hard surface 1/64-in. thick card stock be used for making the templates. The colors used will depend upon what are available, but they should be in definite contrast to one another, and the shades should be light, so that the lines and lettering will stand out. Color A should be used for machines in the current layout; color B for machines in the working set; color C for equipment in the current layout, and color D for equipment in the working set.

From data on the sketches the outlines of each machine are drawn on color A card stock with a sharp HB grade pencil. The compact outline should be prominent. The outline of extreme space occupancy in operation is drawn in lightly as a cutting line. Also marked on the card closely to the scale, is the location of plant serial number plate. Location of wiring connection and workman's operating position are also indicated. The plant serial number and the brief description of the machine are lettered plainly as they were recorded on sketch. Lettering should be legible from the operating side of the machine.

Templates are cut out closely on the line with shears and knife, as required. Typical templates are illustrated in fig. 2. Care taken in making accurate templates is well repaid in the confidence with which they can be used in developing new layouts.

Having completed the templates, a copy of the shape can be readily transferred to another color of card stock to make the templates for the working set by placing typewriter carbon paper, coated side up, over original templates; over this is placed card stock

of the desired color. The card stock is held down with left hand, and with tip of middle finger of right hand, that portion over the original template is rubbed with sufficient firmness to impress a definite outline of the template on the underside of the card. Cutting out to this outline and adding lettering and markings to the upper side gives a duplicate template.

Having completed the templates, both for machines and auxiliary equipment, for a department, the mounting of the templates should be done before starting on another department. This is best done right out in the department and, for convenience and time saving, there should be provided a light but firm work stand, say, 24x24x40 in. high, which can be moved about. Equipped with this stand, a 50-ft steel tape, 6-ft folding rule, plumb-and-line, chalk, scale, and a dispenser roll of ½-in. transparent gummed tape, the layout man and helper are ready to locate the templates on the layout board. Location of the machine is measured to its register point (center of the plant serial number plate) from the west and north bay lines, which may have to be temporarily laid down for this purpose with a chalk line.

As location measurements of each machine are made, it is good practice to list the plant serial number followed by the location coordinates, which will serve as a check after templates are positioned. The position of the machine with relation to the register point is, of course, a matter of observation. Machines set at an angle require that this angle be measured with a protractor. As location measurements for each piece of equipment are completed, the corresponding template is accurately positioned on layout board and fastened with ½x1 in. transparent gummed tape. Established aisle lines are pencilled in.

When a layout section is completed and checked for accuracy, a pencilled paper tracing is made of it. This makes a more dependable record of machine locations than the board with its removable templates and also permits making blueprints of the layout which can be used for studying possible improvements, as well as having value for other purposes. Paper is held on the layout section board for tracing by cutting it several inches longer and fastening its ends to the bottom of the board with gummed tape. All changes in location of the machines in the plant call for prompt changes in the boards and tracings, so that at all times they accurately show the existing layout.

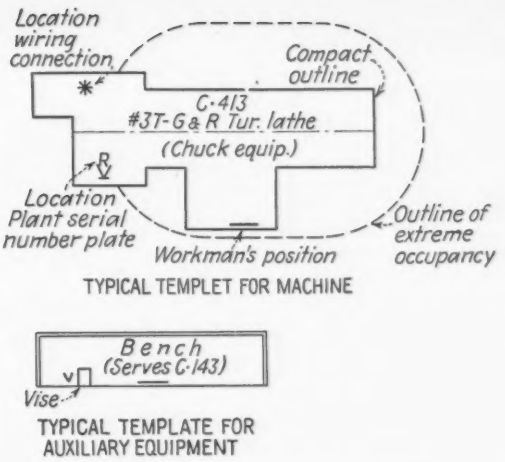


FIG. 2—Typical template for a machine.

In conclusion, the most important use of a good plant layout is the uncovering of opportunities to save money. With the working set of templates taped to a blueprint of the current layout, management can easily experiment with rearrangement of machines and departments. Usually several promising arrangements are developed in the course of the study, each having its own outstanding features. As each is completed, a rough tracing is made of it before trying another arrangement.

Having records of several alternative plans side by side to compare and discuss is a distinct advantage in arriving at the best layout.

New Books

"Job Evaluation," by F. Johnson, R. Boise, D. Pratt. Extensively illustrated, comprehensive explanation of functioning of typical job evaluation programs under actual operating conditions. John Wiley & Sons, Inc., 440 Fourth Ave., New York, 16. 288 p, $3.75.

* * *

"Trigonometry Refresher for Technical Men," by A. A. Klaf. Question and answer method is used to explain plane and spherical trigonometry. Problems in mechanics, electricity, light, physics, hydraulics and construction of trigonometric tables by use of De Moivre's theorem are included. McGraw-Hill Book Co., 330 West 42nd St., New York 18. 629 p., $5.

* * *

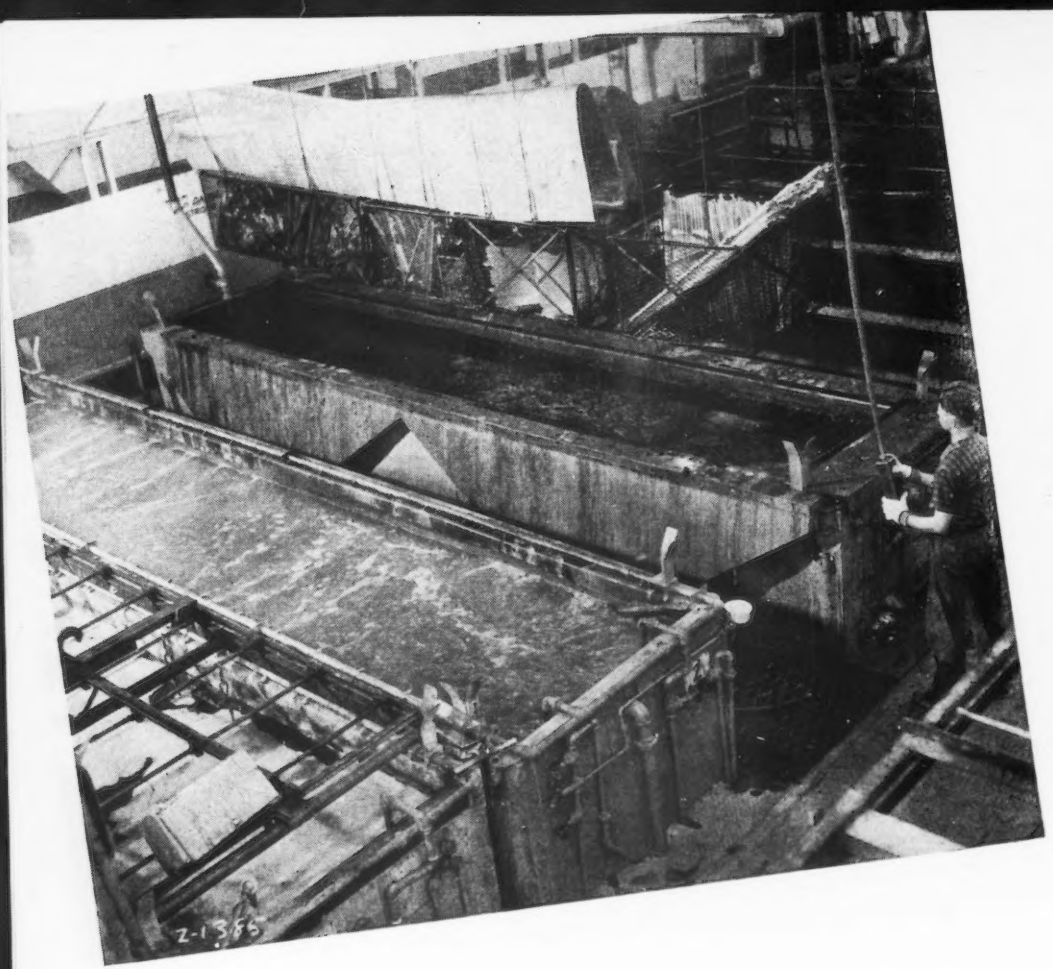
"ASME Mechanical Catalog." Thirty-sixth annual edition of new mechanical catalog and directory covers nearly 5000 firms and 50,000 product listings. Volume also includes alphabetical list of trade names and 16 pages on ASME codes, standards and other publications. American Society of Mechanical Engineers, 29 West 39th St., New York 18. 792 p. Available only to ASME members.

* * *

"Atomic Theory for Students of Metallurgy," by W. Hume-Rothery. Written primarily for advanced students and research workers, book is designed to give an understanding of ideas underlying the electron theory of metals. Institute of Metals, 4 Grosvenor Gardens, London, S.W.1. 286 p., 7s 6d.

* * *

"Heat Treatment of Aluminum Alloys." Information on heat treatment of aluminum alloys in readily usable form for both nontechnical men and highly trained technicians is given in this volume. One section presents nontechnical discussion of subject; second section gives tables of recommended thermal treatments; third section is a detailed technical discussion for the metallurgist and engineer. Reynolds Metals Co., 2500 S. Third St., Louisville 1. 144 p., $1.



Aluminum C

By JOSEPH S. BRADY
Technical Supervisor, Optimum Detergents Co., Matawan, N. J.

ONE of the first steps taken in working with aluminum is cleaning, for none of the other processing steps, such as welding or anodizing, can be performed before the aluminum is made chemically clean. Cleaning involves the complete removal of stamping and slushing oils, drawing compounds, identification paint, and the shop dirt commonly found on the metal. In addition, surface oxides must be removed prior to anodizing, spot welding or plating and the entire surface left in a uniform metallurgical condition.

Because of the nature of aluminum, it is not an easy metal to clean. It is sensitive to both acids and alkalies and is readily attacked by them with resultant corrosion. Usually the hydrocarbon solvents and the chlorinated materials used in degreasers are safe to use on aluminum, but constant care must be exercised to prevent contamination of these solvents by moisture or other decomposition inducing impurities. A further disadvantage of these solvents is their failure to produce the chemically clean "water break free" surface essential to subsequent steps of processing.

Aluminum is usually cleaned in an inhibited alkaline solution. The inhibitor is usually a material which combines with the surface oxide of the aluminum or the aluminum itself to form a protective film which resists the dissolving action of the alkali. These materials are usually silicates, chromates, fluorides, silicofluorides or, in rare cases, organic materials. In function they are the same in that they produce an insoluble film on the aluminum which resists further corrosion by the alkali solution.

A solution may be formulated which will not attack aluminum even at boiling temperatures and for prolonged immersion times, by a proper selection of inhibitors and a judicious balance of stronger alkalies. Such a cleaning solution will be weak and slow in its cleaning properties by virtue of its strong film formation tendencies. The fault of such a highly inhibited cleaner lies in the film it produces. This insoluble and tenacious film may interfere with subsequent processing to such an extent as to render the process not practical.

The ideal aluminum cleaner should have a minimum effect on the surface in regard to etching, but some microscopic etching is desirable because it speeds the cleaning cycle and prevents a heavy insoluble film formation. This can be done, by proper formulation, and alkalies strong enough to remove grease, oil, paint and shop dirt are usable. At the same time, protection is afforded the aluminum surface and film formation is held at a minimum. The slight gassing action is also beneficial as it scrubs the surface with tiny gas bubbles and mechanically removes surface soil.

It is usually found that, upon immersion of aluminum in the type of bath previously described, the surface gasses slightly for a short period of time and then the action diminishes. During this induction period, some microscopic etching takes place, gas scrubbing occurs, and film formation starts. As the time of immersion increases, gassing stops and a protective film is

Cleaning Procedures • • •

Practical procedures for establishing a clean surface, vital in determining efficiency and costs of subsequent finishing and fabricating steps, are described in this article. The author discusses the behavior of various cleaning, oxidizing and deoxidizing materials and suggests means of avoiding incomplete rinsing. Effect of surface preparation on welding operations is also covered. While touching on some currently controversial subjects, this article represents a down-to-earth review of good cleaning practices

formed. By this time, however, the surface has been scrubbed and cleaning has started. The film formed, being slightly soluble, is maintained in a thin form. Having passed through the induction period, the cleaner then acts upon the surface in the usual manner by emulsification, deflocculation, peptonization, dissolving action, saponification, and reduction of the interfacial tension. The resulting aluminum surface shows no visible etch, but is chemically clean and water break free.

Another approach to the inhibitor problem is to use one which, although insoluble in the alkaline solution, is soluble either in water at a pH of 6.5 to 7.0 or in subsequent acid baths. In this case, an inhibitor from the fluo-silicate group can be used. When immersed in an acid, it would yield the corresponding acid in situa and act as an oxide remover.

During the cleaning cycle for aluminum it is not uncommon for the cleaning solution to dry on the work before rinsing takes place. This drying and concentration of a thin film of cleaner is particularly undesirable if an inhibitor is used which is too protective in its action. The removal of such a film in the rinse is almost impossible and it remains to interfere with the next step in processing. However, if the inhibiting film is thin and of such nature as to be soluble or easily removed in the rinse, the problem becomes inconsequential.

Once a suitable inhibitor has been selected, there remains the balancing of the alkaline materials to give good cleaning. As a rule, no free caustic is permissible. Other materials having a pH in solution of not over 12 can be used advantageously. In addition, some provision should be made to sequester calcium and magnesium salts so that they do not precipitate and redeposit on the work being cleaned. These sequestering materials also hold back floc formation and have a peptonizing effect on the soil removed from the work. Total CO_2 content of the cleaning mixture should be held to a low minimum as carbonates promote decomposition of the silicates and give a heavy floc which will redeposit on the work.

The presence in the cleaning mixture of a sufficient quantity of wetting agent is also of prime importance. By the use of an efficient, stable, and completely soluble wetting agent, the interfacial tension between the metal surface and contaminating oils is at a minimum. This promotes quick removal of surface oils and insures penetration of the cleaning solution into any open pores in the metal. In addition, the presence of the wetting agent, which also has emulsifying action, prevents the redeposition of oil on the work and keeps it in suspension in the solution for long periods of time. Wetting agents of a suitable type also aid in rinsing, not only by their surface activity, but by preventing the formation of a hard dried-on layer or film which may develop if there is a delay between cleaning and rinsing.

These remarks apply to the cleaning of all aluminum alloys. Some alloys will have a longer induction period than others but, in general, all will be subjected to a preliminary microscopic etch while a protective film is being built up on their surface.

Occasionally aluminum alloys in an unstable metallurgical condition are encountered which do not follow the usual pattern. Due to the migration of the various alloying constituents during heat treatment, the surface of the aluminum presented to the cleaning solution is not stable. In these cases, the induction period during which gassing occurs is prolonged and the etching action is active enough to give a faint etch to the surface. However, if corrosion salts are not noticeable on the work after it has been rinsed and dried, no trouble should be expected. Other causes for excessively long induction periods are the presence of corrosion salts formed by moist air, salt, or other chemical action, on the surface of the aluminum.

Aluminum sheet, stacked without protective paper in a moist atmosphere, will often develop large corrosion spots which will not react to form an inhibiting film in the cleaner. These sheets etch in the corroded area during the entire cleaning cycle, while the uncorroded section of the sheet acts in a normal manner. If a large number of these corroded sheets is to be processed, the sheets can be dipped in a hot solution (6 oz per gal) of sodium acid sulphate, or, preferably, a cold 20 pct nitric acid solution before alkaline cleaning. This acid treatment dissolves the products of corrosion and leaves the aluminum in better condition for the cleaning bath.

As there is no grease or soil removal in these acid

baths, and as sodium acid sulphate produces a smut on most aluminum alloys, a hand swabbing is necessary in the rinse following the alkaline cleaning bath. Frequently only one side of a normal-appearing aluminum sheet will corrode, but these acid baths will take care of most cases encountered in production.

The rinsing operation following alkaline cleaning is most important in maintaining quality of cleaning,

TABLE I

Remedies for Common Aluminum Cleaning Troubles

TROUBLE	CAUSE	REMEDY
Excessive Corrosion in Cleaning Bath	*pH too high or loss of inhibitor	*Reduce pH, add inhibitor or make up new solution of proper balance
Corrosion in spots	Corrosion products from prior treatment left on surface	Pre-dip in $NaHSO_4$ or HNO_3 bath and rinse
Failure to produce a clean surface	Weak or worn out cleaning solution. Lack of sufficient alkali and wetting agents	Make up cleaner to standard strength or renew solution. Change to cleaner of proper pH and wetting agent content
Failure to produce a clean surface	Excessive amounts of foreign matter on work to be cleaned	Degrease in vapor degreaser or solvent emulsion clean prior to alkali cleaning
Poor paint bond	Poor rinsing or too tenacious inhibitor film, also improper film removal in deoxidizing bath, if used. Excessive floc pickup in cleaner	Clean out rinse tanks and increase rate of water flow through rinse tank. Select cleaner with easily removed inhibitor and minimum floc formation. Use deoxidizer designed to remove surface film
Smut formation on the work in the cleaner	Usually occurs on copper bearing alloys if pH is too high	*Reduce pH, avoid free caustic cleaners and use enough inhibitor to prevent corrosion
Excessive floc formation	Break down of CaMg and Si sequestering agents, absorption of CO_2 by cleaner to form carbonates. Excessive carbonates used in original cleaner formula. Addition of acid to cleaning solution	Select cleaner with ample reserve of stable sequestering agents such as the polyphosphates. Avoid CO_2 from gas burners, etc. by proper vents around tank area. Use a cleaner with no carbonate content. Avoid accidental acid addition by proper supervision of tank
Insoluble film formation that interferes with anodizing, wetting, etc.	Too highly inhibited a solution. Excessive transfer time between cleaner and rinse	Select proper amount of inhibitor which is soluble Reduce transfer time and select cleaner with wetting agents which promote good rinsing. Use a deoxidizer which dissolves insoluble inhibitor film

* Changing the pH can be done only by the addition of proper buffering agents under the control of a chemist.

and often is a deciding factor in the success of subsequent operations. All too often, a great deal of care is taken to obtain a clean sheet of aluminum from the cleaner bath, but only a small fraction of this care is used to properly rinse the cleaned sheet. Rinsing is just as important as cleaning, and the rinse tank, whether it be hot or cold, should be kept clean and free of carry-over. A steady stream of water should flow into and out of the tank to accomplish this. A flow equal to 5 to 10 pct per min of the total volume is not excessive. A test of the rinse water with phenolphthalein will indicate if too much carry-over is being permitted. A clean rinse tank insures maximum film solution and removal, and completely removes any trace of cleaning solution which otherwise would cause trouble in later processing.

If the article is to be used in the clean condition, further processing is not required. However, painting, Alrock treatment, anodizing and spot welding require an oxide removal step which will unquestionably determine the success or failure of quantity and quality production.

It is essential, for painting, that the paint bond be made to the metal itself, and not to an intermediate inhibitor film. The removal of these films and the provision of a bite to the aluminum surface fulfills the requirements for a good paint bond. Recourse is sometimes made to a rough caustic etch for this purpose, but this introduces several additional steps which in the end provide an oxide free surface with a bite for mechanical paint bonding. Oxide removal for this purpose must quickly rid the aluminum surface of all inhibitor films left by the cleaning cycle and, in addition, either dissolve the surface oxides, or render them compatible with the paint film to be applied.

The use of oxide removers prior to Alrock or anodizing is not new but has not been too widely used. The removal of surface oxides provides a virgin surface upon which the Alrock or anodizing bath may be applied to greatest advantage. If both the original surface oxides and the inhibiting film are still present on the surface upon introduction of the work into an Alrock or anodize bath, there is always a delay in the chemical action until these surface oxides are dissolved or converted, then the formation of the Alrock or anodize film begins and proceeds along its normal course. However, since the original oxide and inhibitor film may vary not only in thickness but in ease of removal or conversion, the resulting Alrock or anodized film produced varies and the work is spotty. This condition is particularly noticeable on flat stock.

The use of an oxide remover solution prior to surface treatment insures an even, spot-free Alrock or anodize film in a shorter time and, since the Alrock or anodizing is more uniform over the entire surface, a more corrosion-resistant coating is formed. In the anodizing process, the ultimate high voltage required can be built up in a shorter time and with less surface smut present on the film.

Spot Welding Aluminum

In the spot welding of aluminum and its alloys it is of prime importance for the surface to be uniform in its electrical resistance, and for that resistance to be of a low order. The problem here is a dual one of obtaining low surface resistance between electrode and sheet to insure a minimum electrode pick-up, and a uniform but low sheet-to-sheet resistance. If the sheet-to-sheet resistance varies in an erratic manner and is of high value, the resulting welds will not be sound. The welding machine, being a constant factor after being initially adjusted, is presented with a varying surface resistance going in extreme cases from 10×10^{-6} ohms to 2000×10^{-6} ohms. The heat used to produce the weld is a product of I^2RT and if R varies through a large range, I or T must be constantly varied to produce the same heat per weld. This, of course, is an impossible condition and therefore it is necessary to limit not only the value of R, but also its range, if successful welding is to be achieved. Usually, the welding machine can be set to produce good welds if a sheet-to-sheet surface resistance of 20×10^{-6} is used. The range of good welding at this setting would be approximately 10×10^{-6} to 50×10^{-6} ohms. Welding done with values over 50×10^{-6} ohms is liable to be too hot,

while very low resistances give dud welds. The electrode-to-sheet resistance will not be excessive within the range specified above, and no tendency for welding of electrodes to sheet occurs.

Deoxidization of Aluminum

The materials used to obtain the deoxidation of aluminum fall into four general classes: (1) Sodium acid sulphate solutions, with or without organic additives, such as wetting agents or oxalic acid; (2) phosphoric acid solutions with or without organic additives; (3) chromic acid solutions, and (4) fluorides or silico-fluorides with wetting agents and organic acids.

When the war brought to the fore the problem of aluminum cleaning and deoxidizing, the only past experience was that involving the use of sanding or scratch brushing technique. This method, although slow and laborious, served as a stop-gap until the advent of the hot sodium acid sulphate solution. This application of the acid sodium salt of sulphuric acid gave the welding engineer a chemical bath whereby it was possible to obtain low, consistent resistance with some degree of regularity, and with but three bad features to be overcome. These were the tendency of the aluminum alloys to smut up in the bath, the failure to remove siliceous inhibitor films remaining from the cleaning cycle and the necessity for heated solutions and special tanks to hold the solution. A fourth possible objection to the sodium acid sulphate was the comparatively longer time of immersion needed to secure the lowest consistent surface resistance.

The use of cold phosphoric acid eliminated the need for special heated tanks, but required almost 22 min immersion time to secure the minimum surface resistance. In addition, it had the two similar disadvantage of sodium acid sulphate, that of smutting and failure to remove silica films from the surface of the aluminum.

The use of chromic acid alone, or in combination with mineral acids or acid salts, was next developed. The results in the few war plants using the chromates were very erratic. On Alclad 24ST alloy, the resistance values were erratic and high, but on copper bearing alloys such as 24ST or 17ST the results were satisfactory. The chromic acid bath was used both hot and cold, required lead tanks and had, as its saving grace, no tendency to produce smut on any of the aluminum alloys. The removal of silica films was beyond the power of these chromate baths and left, in addition, a chromate film which interfered in some cases with subsequent processing.

The introduction of fluo-silicic acid for the surface treatment of aluminum, marked a forward step in the treatment of the popular Alclad 24ST alloy. A solution of fluo-silicic acid used at approximately 1 pct conc. cold, not only reduced the surface resistance of the Alclad to a satisfactory value, but it also removed the silica film heretofore unremoved, and rendered the surface in prime condition not only for spot welding but for painting. Fluo-silicic acid has few objections, other than its toxicity in concentrated form and its tendency to smut even Alclad. The low concentration at which it is used gives good economy of operation, but the control of the solution is more difficult. The introduction of a large area of aluminum into the bath quickly depletes the acid and builds up the insoluble aluminum salt. There is very little buffering action possible with fluo-silicic acid solutions, as the introduction of sodium salts only precipitate the relatively insoluble sodium fluro-silicate. Most other metallic salts act in a similar manner so that the acid itself must be constantly added to maintain strength of solution and time of immersion scheduled.

The straight fluorides such as H F, or salts of the acid, have little to recommend them. Their characteristic curves of resistance v. time of immersion have a sharp V-shape and the time of immersion is both short and critical. In addition, the tendency to smut the surface is great on most all the aluminum alloys and hand scrubbing is usually necessary. However, for repair welding and on short runs, the use of H F is justifiable even though hand scrubbing must be done. This material has proved to be valuable as an extra aid to the regular cleaning and deoxidizing cycle.

These classes of materials cover the deoxidizing field as far as commercial application is concerned, but there are many other materials which have been investigated which will produce a low uniform surface resistance on aluminum and its alloys, under certain conditions. For instance, household vinegar (dilute acetic acid) has been used on Alclad 24ST with fair results. The list of mineral and organic acids which dissolve surface oxides is long, but only by properly blending their properties with other more common deoxidants can successful material be turned out which is satisfactory for the treatment of the many alloys of aluminum.

Check List for Cleaning Aluminum

When using a prepared cleaner:

1. The cleaner used should contain an inhibiter of such characteristics that insoluble film formation is avoided.

2. Calcium and magnesium sequestering agents should be incorporated to prevent precipitation of hard water salts and floc on the work.

3. No free caustic or high carbonate content is justified.

4. Selection of alkaline cleaning agents which give a pH of twelve or under is desirable if they are properly balanced.

5. Use of wetting agents which are efficient, stable, and in proper concentration are preferred. Soaps should not be used as they tend to form insoluble aluminum soaps.

6. Slight gassing during the induction period is beneficial because of a mechanical scrubbing action.

7. An inhibitor film, after induction period is over, must be maintained, but in a thin, easily removable form or one which reacts in a positive direction during subsequent operations.

8. All components of the cleaner, when dried from a thin layer solution, should be easily redissolved and removed in the rinse.

9. A chemically clean surface hydrophylic in nature should be the ultimate result of the completed sequence of cleaning operations.

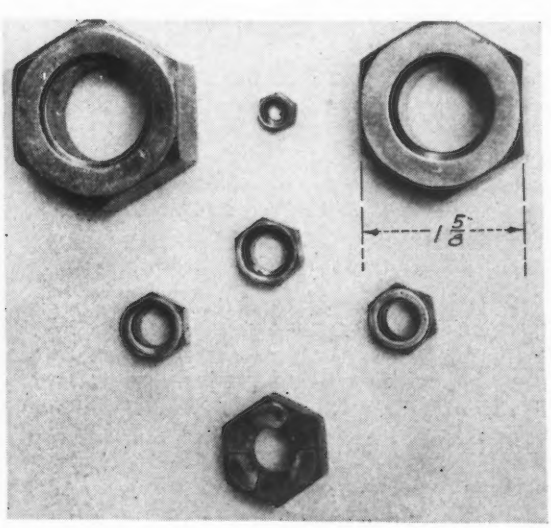
10. The cleaner in the dry state should be free flowing, dustless, and completely soluble in water solution.

Waterbury Farrel Announces Giant Nut Former

CAPABLE of producing 1-in. American standard steel nuts, or the equivalent, at the rate of 50 per min, a new nut forming machine, designated as No. 8, has been introduced by Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

While Waterbury Farrel has for many years manufactured a complete range of sizes of various types of machines used for making bolts, screws, rivets, nuts and similar parts, this new machine is said to be the largest ever constructed. The nuts it produces measure 1⅝ in. across the flats, and 1 in. in height, and tooling can be provided for making these in various types, including washer-faced and chamfered on one or both faces, as well as castle nuts and special types, as shown in fig. 1.

Basically, this nut forming machine is an automatic, multiple solid die, single-stroke crank header, especially constructed and tooled for cold forging nut blanks from cold drawn steel wire or rods, or from any other forgeable material, in much the same manner as is employed to upset bolt and screw heads. It is designed to form a complete nut blank with every stroke of the gate or slide.



For making 1-in. nuts, the machine, shown in fig. 2, is supplied with 1½-in. diam rods, fed end to end by a roll feed mechanism. The blank is sheared off and transferred successively to a series of tools which shape and finally pierce it, and then eject it as a completely formed nut blank ready for tapping. The center piece that is punched out to make the hole, and the short crop ends of the rods, are the only scrap. Where wire coils are used, as on the smaller machines, there are no crop ends and the scrap is correspondingly less. A conveniently located hand lever permits the operator to free the short ends, so that these drop out as scrap and are not carried into the dies.

The machine follows Waterbury practice in the gate or slide construction which rigidly supports and accurately guides the rapidly reciprocating gate with its multiple punches. The gate is attached to two large diameter tubes extending the entire length of the frame, and it is these tubes, rather than the gate itself, which slide in long bearings located in front of and in the rear of the tools. The punches are thus held in exact alignment with the stationary dies. This feature is said to add materially to the general efficiency of the machine, both for high production and for relatively low tool upkeep.

A 75 hp motor drives the machine through multiple V belts. The overall weight is approximately 175,000 lb, including the 54-in., 3800 lb balance wheel on the backshaft. It occupies a floor space 15 ft wide by nearly 20 ft long.

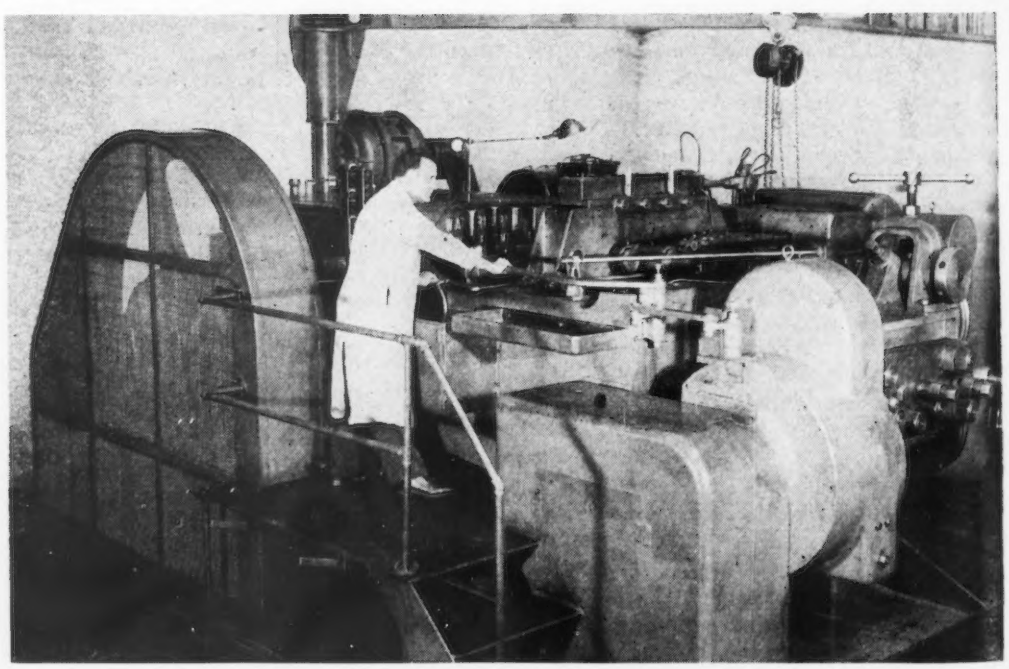
ABOVE

FIG. 1—Representative examples of nut blanks produced by cold forming, including two 1-in. blanks produced on the new giant machine.

o o o

RIGHT

FIG. 2 — Largest nut former ever built, this No. 8 Waterbury Farrel machine can form 1-in. nut blanks from 1½-in. diam rod at the rate of 50 per min.



New Equipment . . .

Laboratory Equipment

Newest developments in testing and measuring instruments for laboratory and shop use, such as surface analyzers, metal testing machines, pressure gages, operational recorders, coil testers and a portable hardness tester are described in the following pages.

DEVELOPED for measuring minute roughness of surface finishes, the Topograph, which operates on a pneumatic principle and gives a pen-record of the profile of the surface along a selected straight track, has been announced by

David Brown & Sons (Huddersfield) Ltd., Huddersfield, England. The instrument can be used for flat and curved surfaces that contain a straight line along which the tracer point may traverse. The response of the instrument is uniform for wave-lengths greater than 0.0005 in. and wave lengths are said to be reproduced with uniform magnification. The instrument includes no electrical apparatus but must be fed with air at any pressure between 35 and 90 psi. The ratio of pen movement to tracer movement is adjustable between 5000 and 20,000 to 1; pen movement of 0.1 in. corresponds to roughness depth of 20 to 5 microinches according to the setting of the instrument.

Surface Finish Standards

CONFORMING to the preferred-number series which the A.S.A. has adopted for designation of surface finish, a pocket set of standards, called Type 7 and announced by the *University Machine Co., Div. of Baird Associates*, Cambridge, Mass, affords means of checking surface finishes over a wide scale of roughness. The set consists of twenty small blocks of stainless steel, each of which is machined to the surface finish specified for one of the preferred-number standards. The finish is checked by drawing a fingernail across the specimen and across the standard. Small differences in surface finish are apparent by the feel of the surface. The standards are held in a case, $3\frac{3}{4}$x$4\frac{7}{8}$x$\frac{5}{8}$ in., with the microinch reading and method of cut shown for each block.

Surface Analyzer

MEASURING surface finishes of metals, glass, plastics, plated and painted surfaces in the laboratory, in the production line, or in final surface checking, is possible with the model BL-103 surface

analyzer announced by the *Brush Development Co.*, 3405 Perkins Ave., Cleveland 14. The instrument checks surface finishes from less than 1 to 5000 microinches. Exploration is achieved with a fine diamond point. A magnetic direct-inking oscillograph provides a chart record of surface measurement. Warmup time of 2 min makes possible instant use of the instrument in cases where time delay would affect inspection. Accessory equipment for the analyzer includes an rms meter which provides a constant visual check of rms surface roughness where peak and valley profile records are not needed.

Recording Dilatometer

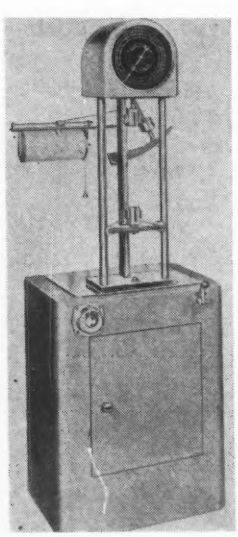
FOR continuous recording of the thermal expansion and contraction of a wide range of materials including metals, glass, plastics and

ceramics, an improved automatic dilatometer has been announced by the Electronics Div., *Sylvania Electric Products, Inc.*, 500 Fifth Ave., New York. The equipment is designed to provide continuous graphic recording of the 12-hr expansion and contraction cycles of samples. The instrument which records automatically without supervision, is useful in the laboratory study of ferrous alloys at thermal critical points, as the recording densitometer permits determination of true variations in length, it is claimed, even when samples exhibit exceptions to the rule of elongation as a function of temperature. Recording meter and other instru-

ments are flush-mounted permitting visual indication of operating temperatures and the progress of the thermal expansion curve plotting elongation against temperature. The dilatometer will accommodate 3, 4, or 5-in. specimens and temperatures up to 1832° F. It is designed for use at 110 to 120 v, 50 or 60 cycle supply and is rated at 900 to 1000 w.

Low-Range Tester

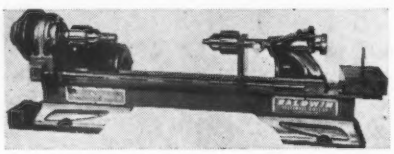
FOR physical testing of lighter raw materials and small finished items, a low-range tester has been developed by the *W. C. Dillon & Co., Inc.*, 5410 W. Harrison St., Chicago 44. It has four separate



capacities incorporated, each available instantly, and shown individually on its dial. These range from 0 to 10 lb in 1 oz dial divisions, 0 to 25 lb in 2 oz, 0 to 50 lb in 4 oz, and 0 to 100 lb in 8 oz divisions. Its lower grip travel is continuously variable, or stepless, from 0 to 19 ipm. It is said to have ½ of 1 pct accuracy and features pendulum action, max-load reading, featherweight and swivelled upper grip, stroke limiting switches, forward-reverse switch, elongation gage, stress-strain recorder, and numerous other features. Overall height is 63 in.

Torsion Testing Machine

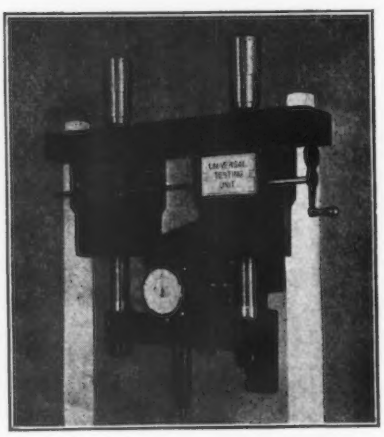
DEVELOPMENT of a torsion testing machine for wire has been announced by the *Sonntag Scientific Corp.*, an affiliate of the *Baldwin Locomotive Works*, Philadelphia 42. The machine will test bronze and copper trolley wire, telephone and telegraph wire and steel tie wire with diameters from 0.090 to ¾ in. in accordance with ASTM specifications. Three twisting speeds, 10, 20 and 30 rpm, with reversible rotation, are available with



a maximum torque of 1000 in-lb. Stresses up to 80,000 psi can be obtained on ½-in. specimens. The specimen can be preloaded in tension and a reset type counter disengages automatically when the specimen fails.

Universal Testing Unit

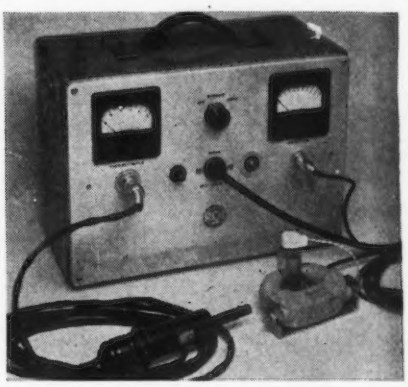
A UNIVERSAL testing unit for testing heavy and large work which cannot be readily tested in any of the standard size Rockwell hardness testers or the Rockwell superficial hardness testers has been announced by the *Wilson Mechanical Instrument Co., Inc.*, 383 Concord Ave., New York. The unit is mounted in whatever design of rigid frame the user builds to meet various requirements. In the illustration the unit is the dark portion. The frame shown is replaced by a rigid supporting frame designed to suit the intended application. Large gears, rolls, and



other large and heavy pieces can be handled for Rockwell testing in this manner, it is said.

Electronic Vacuum Gage

DESIGNED for operations requiring continuous and accurate measurements of reduced pressures as low as 0.1 micron, a vacuum measuring gage has been manufactured by the Engineering Products Dept., *Radio Corp. of America*, Camden, N. J. The gage, designated as RCA type EMG, has been developed as a separate, portable unit for modern vacuum systems in which rotary pumps are used to back oil diffusion pumps. The gage is said to continuously indicate the pressure while the mechanical pump is rough pumping, and serves to show the critical point at which the diffusion pump should be connected. The vacuum measuring unit incorporates two types of gages, a thermocouple gage and a discharge gage, which have standard pipe fittings for connecting to a vacuum



system. A rotary switch is used for operation of either gage. The thermocouple gage makes the higher pressure measurements, while the discharge gage is used to give current indications for very low pressure measurements. The instrument weighs 18 lb and measures 10 in. high x 13½ in. wide x 8¾ in. deep.

Radioactive Tracer

KNOWN as the Autoscaler, an instrument for making quantitative measurements of radioactivity has been developed by *Tracerlab, Inc.*, 55 Oliver St., Boston, Mass. This instrument is a line-operated device which supplies the high potential for a Geiger-Mueller tube, counts the impulses from this tube, and measures the time required for the reception of a given number of impulses. It features automatic operation with no internal adjustments, has automatic stops and after a predetermined number of counts up to 4096 provides a relay control contact. It is a selfcontained unit, including high voltage supply, precision timer and an electronic counting circuit. It can be used with all standard Geiger-Mueller tubes, it is said. Impulses from the Geiger counter are fed to a pre-

amplifier, a two-stage amplifier, and then a multivibrator which triggers the first of a series of 12 "scale by two" counter circuits. Measurement of the time interval required for the

accumulation of the selected number of impulses is accomplished by an output amplifier and cathode follower stage which actuates the clutch of the timer.

Phase Microscope

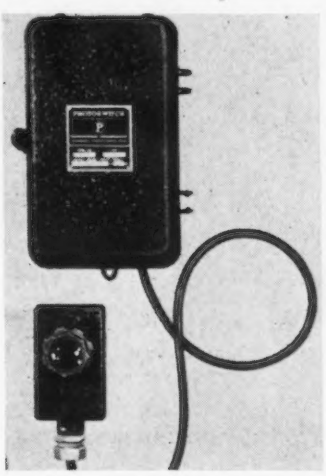
EQUIPMENT which transforms an ordinary light microscope into an instrument that extends the range of human vision beyond the limits of present microscopes has been announced by the Scientific Instrument Div., *American Optical Co.*, Southbridge, Mass. The equipment, when added to a standard microscope, permits the observation and study of replicas of metal and other surfaces, glass and plastic transparent surfaces, minerals, crystals, synthetic fibers and other materials. The converted instrument is called a phase microscope. The equipment consists of newly developed light-controlling diffraction plates. Placed in an objective lens system, the plate makes detail visible within a specimen by increasing, reducing or reversing contrast in the image formed by the microscope. Different types of diffraction plates are preferable for various kinds of investigations.

Elapsed Time Indicator

PRODUCTION of the model HM-3 elapsed time indicator for operation on 115 v, 60 cycles, indicating elapsed time from 0 to 9999.9 hr has been announced by the *Marion Electrical Instrument Co.*, Manchester, N. H. The instrument features glass-to-metal hermetic seal construction which makes the unit applicable not only in production and maintenance operation in general industry, but also in chemical and allied industries where corrosive fumes or high humidity are present. This hermetic sealing also assures exclusion of dust, dirt or moisture under all climatic conditions, adding to the dependable performance characteristics of the instrument, it is said.

Photoelectric Control

SERIES 20 and 21 photoelectric controls suitable for such applications as counting, conveyor control, short-range signal systems, motor or valve control, production inspection, machinery safeguards and stop-motion control, have been developed by *Photoswitch, Inc.*, 77 Broadway, Cambridge 42, Mass. The phototube which must be located at the point where operations are being observed is available either integral with the housing or in a small separate housing. A tamper-proof sensitivity adjustment is provided on the control housing to permit positive operation over varying distances between phototube and light source.



A single set of terminal board connections in the control provides the supply current for the light source. The control is said to be impervious to moisture, and designed to give unlimited life under conditions of high temperature and humidity.

Selfbalancing Potentiometer

CALLED an Autopot, a portable selfbalancing potentiometer has been announced by the Meter & Instrument Div., *General Electric Co.*, Schnectady 5. Completely self-contained, the instrument is an electric device for converting small dc voltages to measurable currents without appreciably overloading the measured circuit. Among the services to which the Autopot may be applied are: Telemetering, temperature measurement, analysis of electronic circuits, as a source of constant current, and measurement of unbalance in bridge circuits and the drop across shunts where lead

resistance is critical. Dc voltages as low as 10 microvolts and up to 1 v can be measured with any indicating or recording instrument drawing up to 5 milliamperes and having a resistance of 1500 ohms or less. The 5 x 10 x 7¼-in. case houses the bridge elements, power supply, light source, and light-beam galvanometer.

Coil Testers

TWO COIL testers designed to detect short circuits and defective insulation in high-speed production testing of electric coils have been announced by the *General Electric Co.*, Schenectady 5. The testers, available for high-voltage or low-voltage applications, are useful for testing such coils as those to be assembled into small motors, relays, radios, transformers and instruments. The low-voltage tester shows the presence of short-circuited turns in a coil; the high-voltage tester is used when an over-voltage test is required for the insulation between turns and layers of coils.

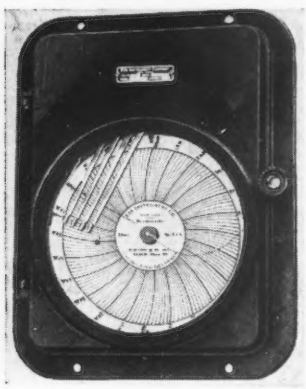
Pressure Gages

EMBODYING advanced engineering technique for a heavy-duty type pressure gage suitable for severe industrial service, a large dial size pressure gage has been introduced by the *U. S. Gauge Div.* of *American Machine & Metals, Inc.*, Sellersville, Pa. The internal parts are made of noncorrosive metals and the working elements are designed to withstand repeated pulsation and vibration as well as high overpressures. Supergages are made in pressures ranging from 30 to 10,000 psi and come in 4½, 6 and 8½-in. dial sizes.

Operational Recorder

TO provide a continuous record of time on and time off of multiple operations, such as process timing, time study work, and peri-

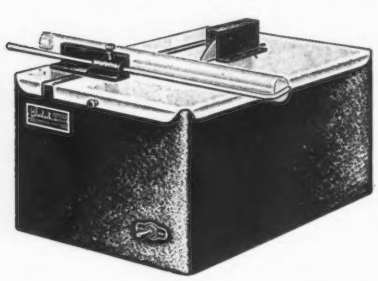
odical operations which can be connected electrically such as boiler blow downs, an operational recorder has been produced by the *Ess Instrument Co.*, Bergenfield, N. J. This instrument can be provided with a single acting pen, two-position double acting pen or a three-position pen. As many as six single or double acting pens can be combined on a single chart. It can



be supplied in 115 to 230 v ac or with special voltages on application. AC clock mechanisms are available from 15 min periods to 8 days.

Glass Tubing Cutter

TO be used where glass tubing or rod and porcelain or silica tubing are cut frequently, a glass tubing cutter has been developed by *Eberbach & Son Co.*, Ann Arbor, Mich. The instrument is equipped with a 5-in. wheel, having speed of 3400 rpm through a V belt drive. Overall dimensions are 9 in. high x 10½ in. wide x 16 in. long. Off-on toggle switch mounted on the front of the case controls operation on



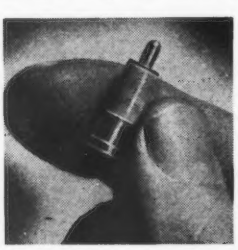
110 v, 60 cycle ac. Pyrex glass tubing up to ½-in. OD can be scored or grooved by the machine, soft glass tubing up to ¾-in. OD can also be handled easily, it is said.

Stainless Thermometers

STAINLESS steel thermometers with 3 and 5-in. dial sizes and 1 pct accuracy over the entire scale has been announced by *W. C. Dillon & Co., Inc.*, 5410 W. Harrison St., Chicago 44. Stem and mounting nut are of 18-8 stainless steel, resistant to all but a few acids, it is said. The pointer fixed to the shaft and the shaft to coil, work without gears. The mounting nut, welded to the stem for most pressure uses, is ½-in. standard pipe thread, and the ¼-in. diam stem comes in either 5 or 9-in. lengths. The dial is made of anodized aluminum, with white figures on black background.

Crystal Converters

COMPACT silicon crystal converters for use as first detectors in high frequency superheterodyne receivers have been announced by the Electronics Div., *Sylvania Electric Products, Inc.*, 500 Fifth Ave., New York. The crystals which are present in a small cartridge measuring approximately ¾ in. long x ¼ in. in diam are



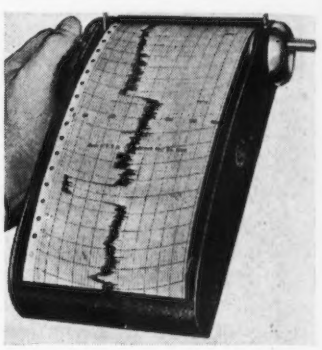
available in three types designed for frequencies up to 10,000 mc. Crystal converters require no filament or heater supply and take only a fraction of the space required by vacuum tubes. Low thermal noise and i-f impedance are other features.

Miniature Magnifier

CALLED the Mini-Mag, a miniature magnifier, small enough to carry in a vest pocket or purse, has been placed on the market by *Edroy Products Co.*, 480 Lexington Ave., New York 17. The unit measures 1¼ in. wide x 2¼ in. long and weighs only ¾ oz. The lens is rectangular in shape, ground plane on one side and convex on the other, and provides a clear sharp field from edge to edge, it is said. Magnification is 3½ times the size of the object. The lens folds into a handle of brown lumarith.

Chart Viewer

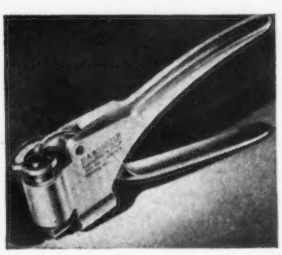
INSPECTION of strip-chart records can be simplified with the lightweight chart viewer designed by the *Meter & Instrument Div., General Electric Co.*, Schenectady 5. The device is available in two models; one for use with 4⅜-in. wide record rolls and one for 4-in. wide rolls. The viewer is constructed of sheet aluminum, fin-



ished in gray crackle. The record roll to be viewed is placed in a trough at one end of the viewer, and the free end of the paper is wound onto the spool of the other end by hand operation of a crank.

Hardness Gages

TWO hardness gages, Model B and Model B-75, for determining variations in hardness of aluminum and its alloys, copper, brass and other nonferrous metals, have been added to the line of hardness gages manufactured by *R. A. Webster*, 422 Twentieth St., Santa Monica, Calif. These gages are designed to quickly and easily identify heat-treated materials from those which have not undergone heat treatment, to recognize parts made from an improper or substandard alloy, to differentiate between soft and work-hardened materials, to test for proper response to heat treatment and to segregate material in stock. These small, portable instruments are operated by compressing the handles, which



actuate the penetrator. Model B which provides a dial reading from 1 to 20 is for direct hardness readings on aluminum alloys and Model B-75 is for brass and other nonferrous metal tests. The anvil design permits tests upon stock of any shape,

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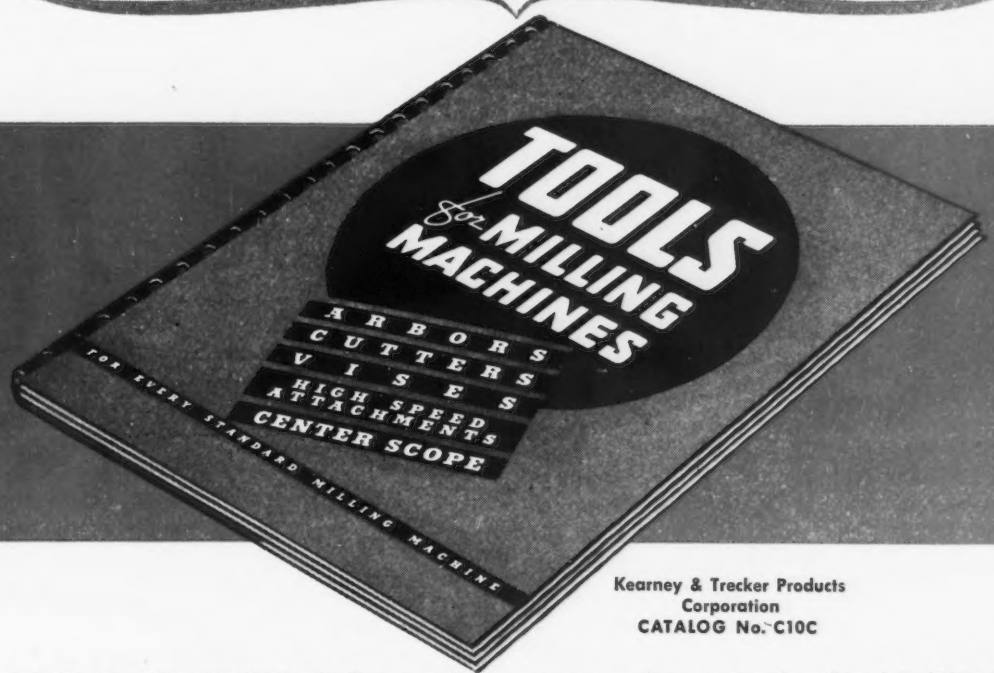

Kearney & Trecker Products Corporation
CATALOG No. C10C

This new Catalog No. C10C is the last word in convenience when selecting milling tools. It's actually 5 catalogs in one, giving complete technical data on Arbors, Cutters, Vises, and other accessories and equipment. 50 pages of useful information — spirally bound in one book that opens flat and smooth for quick, easy reading — it's the type of catalog every machine shop man wants to have around — handy! This bulletin would prove useful to your superintendent, master mechanic, tool and die men as well as your purchasing executives—send us your list on your company letterhead and we will be glad to mail copies to everyone interested in your organization. Would you tell us, please, the name of the magazine in which you saw this announcement.

Kearney & Trecker
Products
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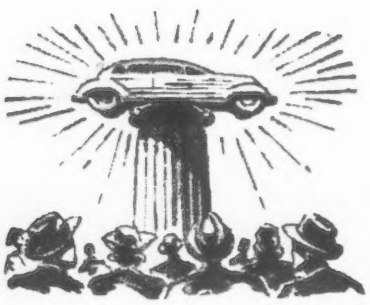
4716

Assembly Line . . .

WALTER G. PATTON

• Briggs introduces its new line of laminated plastics to the industry . . . Many applications seen for the new material . . . 1948 dies being sold as scrap.



DETROIT — Another interesting chapter in the automobile materials book was opened for inspection this week with the introduction of a new plastic paneling and trim developed by A. W. Prance, supervisor of Briggs Mfg. Co.'s design and research department.

The new development which sandwiches photographic reproductions of wood, leather or textiles into impregnated plastic sheets is said to be capable of reproducing in color molded plastic any design that can be reproduced photographically. With such latitude in design coupled with rich deep colors and faithful reproduction of the original, Briggs engineers are predicting an exceptionally bright future for the new material. Single colors are used at present, but multiple color reproductions are said to be well along in the development stage.

At the present time, the Briggs plastic is being used for interior doors, quarter panels and deck lids of the new Chrysler suburban; it has also been adopted by Packard for garnish moldings.

Tests show that the new finish resists wear more successfully than a similar finish on metal, that the material does not warp and has the co-efficient of expansion and strength characteristics that will eventually permit its use for many nonconstructural interior parts of an automobile. These parts include window garnish moldings, instrument panels and sun visors. Prance foresees the time when "everything inside the car except the seat cushions, arm rests and other 'comfort' items may be made of molded plastic."

Briggs is currently using two methods for processing its new plastic automotive trim. On large items such as interior panels, the plastic is first built up in layers of impregnated cellulose material. The plastic is then pressed and baked at 310 to 340°F in flat sheets. Where simple contours such as the rear quarter panel are to be formed, the cured laminate is placed on a forming fixture while hot and shaped to the desired contour. These fixtures also serve as templates for drilling holes. Inexpensive fixtures can be used for this operation and total processing time is about 3 min, making the method particularly economical for large pieces.

In producing plastic parts with sharp contours such as the Packard garnish moldings another method is used. For such parts, Briggs laminates and molds the stock in a single operation using steel dies. Dies are loaded and unloaded outside the press bed. This makes it possible to run duplicate dies from opposite sides of the press thereby permitting maximum utilization of press time.

While the method is not competitive with steel at present for the production of many parts, it offers important potential savings that may be realized later especially where short runs are required. Examples of short run parts are panels, trim and molding for station wagons and certain deluxe models. For such items die costs may be reduced, it is said, from $20,000 or more to less than $1000. Die life is reported to be excellent.

Tensile strength of one of the Briggs plastics is 12,000 psi with 1½ to 2 ft-lb impact.

Abrasion and scratch tests indicate that the new plastic is more durable than regular wood or wood veneer panels. Since the photographed reproduction is protected, the part can be polished or waxed without fear of deterioration. Both panels and molded stock have undergone many months of testing without showing wear whereas other trim materials may become scuffed, worn or otherwise damaged under the same conditions.

At the present time it is not contemplated that the new plastic will be used for outside body parts because of economic reasons and the fact that satisfactory matching of painted metal and painted plastic surfaces have not been obtained.

The new development is a direct outgrowth of Briggs wartime production of gun turrets and plastic research that was undertaken to reduce weight in big U. S. bombers. Asked to produce an ammunition box of plastic material to replace a heavier steel box, Briggs engineers came up with an impregnated plastic box made of layers of wood pulp and rag board and sizal fiber. Molding this core stock into halves and riveting the halves together, Briggs plastic division produced a box that could be made cheaper, lighter and faster than sheet metal boxes. A 3-min cycle was ultimately used to mold the boxes in two halves. Rejections were held to a fraction of 1 pct, according to Briggs.

One advantage of the new method that is not being overlooked is that it seems feasible to produce many parts requiring a comparatively deep draw using only two small inexpensive presses and low-cost wooden dies. After two comparatively simple operations, the part can be produced in finished form in plastic. To make the same part of steel might require the use of three or four large and powerful presses and very expensive steel dies. Following fabrication, the metal article would still have to be cleaned and finished.

It is expected that some weight saving in parts like instrument panels may be achieved. A saving of ¾ of a lb has already been made in the glove compartment door of an instrument panel. It is expected that similar weight saving may eventually be possible in other nonconstruction automotive parts for the inside of the car.

Where studs, bolts or metal catches are used, these can often be inserted in the mold thus eliminating any processing beyond the mold-

THE NOUN THAT BECAME A VERB

"Let's *KELLER* it, Tom... Tracer-controlled milling will save time and money ...give us a better job, too!"

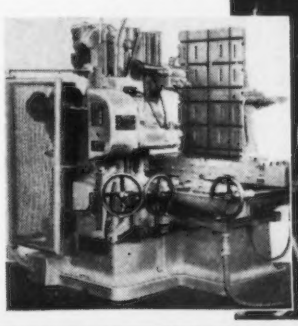
KELLER is the *name* of the Pratt & Whitney Tracer-controlled Milling Machine... a machine that produces dies, mold cavities and many other tools quickly, accurately and at low cost. Hence KELLER is a *noun.*

But, through the years, an unusual development has occurred. The noun has acquired a dual personality. It has been made a *verb* — by industry itself. "Let's Keller it," tool engineers say. "Keller that forging die and we'll lower the costs," remarks the die shop foreman. "Kellering will give us the exact mold duplication we require," asserts the plastics manufacturer.

What *action* does the verb "Keller" denote? Accurate profiling in two dimensions . . . faithful reproduction in relief in three dimensions . . . of complicated forms, dies and punches, die-casting dies, molds for plastic materials, cams, many other metal tools, and even experimental work and pilot models. Master forms may be of metal, wood, cement, one of the artificial stones or pattern materials . . . simple or complex in design.

What is the *result?* Work so accurate that frequently little or no hand finishing is needed. Savings in machine time *and* hand finishing time make a Keller Machine a *paying* investment.

"Kellering" reduces tooling costs, cuts experimental costs. There are Keller Machines to meet the full range of your requirements. Write for complete information.



PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1 • CONNECTICUT

ing operation. Stainless steel inserts have been introduced in the molds to obtain certain desired decorative effects.

REPERCUSSIONS from the canceling of dies for 1948 Chevrolet, Pontiac and Oldsmobile GM models continue to be heard. In addition to its effect on foundries producing large dies, the Detroit scrap market may also be affected. It has been learned from an authoritative source that Fisher Body is planning to sell 2500 tons of the discarded dies this week as scrap. Since the dies weigh up to 50 tons each, breaking costs will be considerable and it is not believed that this material will be available as foundry scrap; rather it is more likely to go to openhearth furnaces where it will substitute for pig iron in the furnace charge. The fact that patterns have also been returned by foundries having die contracts adds a note of finality to the scrapping of the 1948 GM die program.

Having scrapped part of its 1948 dies, it is beginning to look like GM has either postponed indefinitely its introduction of one line of new models or plans to begin again from scratch. Ordinarily, about 9 months are required to produce a complete set of dies. Cost of the dies being scrapped has been estimated as high as $30 million.

Automotive Daily News is currently estimating passenger car production for 1946 at 2,160,000. The present forecast for trucks is 940,000, bringing total vehicle production for the year to 3,100,000. During the past week the truck industry set an all-time high when it turned out 25,655 trucks in a single week. This brings total truck production for the year to date to 888,000 vehicles. Estimated car and truck production for the week ended Dec. 13 is 94,000.

The resignation of James H. Marks, executive vice-president of Packard Motor Car Co., comes as a surprise to his many friends in the industry. Marks was recently honored by the U. S. Government for the assistance he was able to give in facilitating contract termination procedures at the close of World War II.

Marks' plans for the future have not been announced; his duties will be assumed by G. H. Brodie assistant to President George T. Christopher.

GM Leads in Employing World War II Veterans

Detroit

• • • **General Motors** has a higher proportion of World War II veterans among its working force than any industrial group reported by the U. S. Bureau of Labor Statistics, a personnel survey recently completed by GM revealed.

Currently, 32 pct of all employees working for General Motors in the U. S. are veterans of World War II. This includes both returned and newly-hired veterans. The latest Bureau of Labor Statistics report shows that all manufacturing industries had an average of 18 pct veteran employment.

The GM survey showed that July was its highest month for veteran hiring, with 49 pct of the new hires being World War II veterans.

That the vast majority of these veterans working in GM are doing generally satisfactory work was indicated by the extremely low discharge rate. Only two-tenths of 1 pct of the veterans hired by GM have been discharged for cause. The BLS study shows that only the leather and leather products industry has a veteran discharge rate as low as GM. The discharge rate for the automobile industry as a whole was shown as 2.5, or 2.3 pct higher than the GM average.

Announces List Of Surplus War Properties

Washington

• • • **WAA has announced** a list of wartime installations which have recently been declared surplus to government needs. After surveys and classification, these properties will be processed for disposition. The properties are listed by names of lessees for identification purposes only and should not be confused with privately-owned installations.

Among the properties are the following: Bell Aircraft Corp., Plancer No. 168, Wheatfield, N. Y.; American Aviation Corp., Plancer No. 1722, Jamestown, N. Y.; Fairchild Engine & Airplane Co., Plancer No. 1722-B, Jamestown, N. Y.; Pacific Electrical & Mechanical Co., Inc., NOBS No. 1886, Seattle, Wash.; Atlantic Basin Iron Works, NOBS No. 71, Brooklyn; Bauxite Stockpile Facilities, Little Rock, Ark.; Bauxite Ore Mines, Saline County, Ark.; Missouri Valley Bridge & Iron Co., Evansville, Ind.; and Sublette Ridge, Vanadium Project, Lincoln County, Wyo.

PLASTICS FOR STEEL? *Utilizing a new low-pressure molding resin, chemists of the Goodyear Research Laboratory built this new plastic trunk lid for automobiles. It weighs 11 lb less than a similar metal cover and is said to be equally strong. Known as GRM-2, the new resin is a derivative of a complex organic glycol. The material can be laminated with paper, and various fabrics such as canvas and Fiberglas.*

—with tools that increase output, cut machine down-time!

There's sweet music—and lower costs—in the sound of tools turning out piece after piece and maintaining production day after day. And now you can get tools that actually cut costs and increase output by using the Carpenter Matched Set Method of tool steel selection. With this method you can "custom-fit" the tool steel to each tool you make. And once you've selected the steel for best results, the Carpenter Matched Tool Steel Manual gives you accurate, easy-to-use heat treating instructions. As a result, you get tools that step up production and stay on the job longer—with less "time out" for regrinds or replacements. The 168-page Manual gives you all the information you need to put the Matched Set Method to work in your plant. Write for your copy today. Just drop us a note on your company letterhead, indicating your title.

YOU CAN GET RESULTS LIKE THIS BY USING THE CARPENTER MATCHED SET METHOD

PRODUCTION UPPED 167%

MACHINE DOWN-TIME MORE THAN HALVED!

The Job:

Producing aluminum toothpaste tubes in volume quantities on a 200-ton press.

The Problem:

The extrusion die required frequent polishing. Each time it had to be removed from the press, 4 hours of productive machine time were lost.

The Results:

The tool maker, using the Matched Set Method, selected Carpenter K-W (Water-Wear) Tool Steel for greater wear resistance. Output per day was increased 167% and press down-time reduced by more than ½!

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SEE YOUR CLASSIFIED TELEPHONE DIRECTORY

Washington . . .

L. W. MOFFETT

• Whys of John L's strike and of calling it off flow freely in Washington . . . Lewis taken aback by Truman's refusal to knuckle.

WASHINGTON — Predicting the unpredictable, alias John L. Lewis, has been the chief outdoor and indoor sport in Washington during and since his winter coal strike against the government. There are numerous whys of the strike, which was not only directed against the government, but was a breach of the contract which has no date of termination. It is to continue for the duration of government control of the mines.

Among the whys given for the strike are the following:

Lewis, swelled up and with good reason in view of repeated victories over the government or through government support, hoped to bulldoze the government again into granting liberal wage and other concessions, then force them down the throats of private operators when the government turned the mines back to them.

He thought the threat of freezing the country and bringing on a complete nationwide, if not actually a worldwide collapse, would compel President Truman to knuckle to him.

His timing also was designed to get the concessions before the regular session of Congress could enact crackdown legislation on his union and on organized labor generally. Also, Lewis wanted to cast the CIO Atlantic City convention into obscurity.

He wanted to gain complete dominance as the country's labor leader, taking the ball from CIO'ers and setting the pattern for new and higher wages together with more concessions in the way of welfare funds, etc., some of which would sweeten the union's kitty.

He wanted to take over as head of the AFL replacing the venerable William Green, old time crony, as well as one-time enemy who has been more roundly abused by Lewis than by any much cussed "old Tory" in industry.

Lover of theatrics and the limelight to the point of childishness or adolescent artlessness, Lewis by some strange mental quirk imagined himself a hero, beaming inwardly over the adulation of his followers and truculently scorning the vast public ill will that he encountered.

THE whys given for his calling off the strike:

He didn't think Truman would have him taken to court.

Even if he were taken to court, Lewis didn't think he and his union would be handled roughly, expecting some sort of a compromise that really would be a victory for him.

The injunction against him and the fines against him and his union shocked and frightened both Lewis and his lawyers, as did the court's charge of contempt, their challenging and insolent words to the contrary notwithstanding.

Even if the fines are not paid, court action in assessing them day by day certainly offered the prospect of bankrupting a rich union carefully nurtured by Lewis.

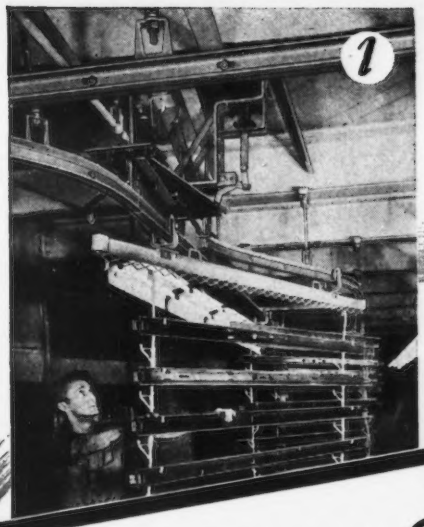
President Truman's adamant stand against any yielding despite some advisers who were for letting Lewis off lightly if he called off the strike, was a painful surprise to Lewis. He saw he had run out of ammunition to continue his fight and now seeks comfort in the hope that the Supreme Court will hold he did not breach a contract, that he was not in contempt of court and that the Norris-LaGuardia Act bars issuance of injunction against labor in disputes with the Government as well as with private employers.

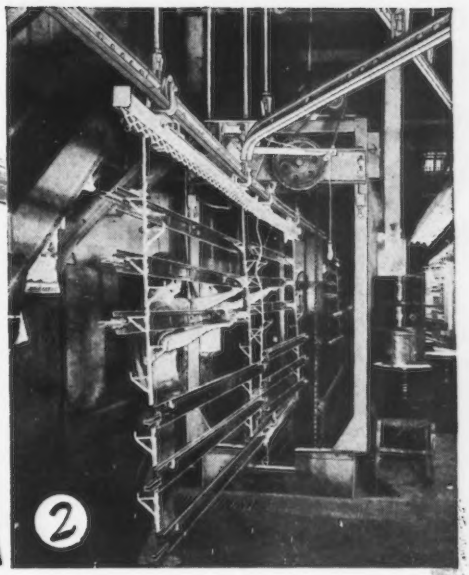
Lewis has a loyal following of men who richly deserve to be paid the highest possible wages consistent with profitable operations and also deserve good living conditions. Yet, while it had not gone beyond small proportions, Lewis was aware of a growing revolt in his union as its workers and families grew weary of sudden strikes and loss of wages, whether it was Christmas time or any other time. That there was a growing break in the ranks is evidenced by the fact that the production of coal by these union miners rose from practically nothing to 2,000,000 tons a week. While it was at the rate of only 17 pct of normal production, it was three times the production of 658,000 tons weekly during the six weeks' strike last spring.

RAILROADS considerably undershot the mark when they estimated revenue from the repeal of land grant rates, effective Oct. 1, 1946. They had estimated that discontinuance of land-grant deductions would increase railroad revenues annually during peacetime from $20,000,000 to $34,000,000, perhaps about $27,500,000. In its recent rate increase case the Interstate Commerce Commission comes up with a much higher figure, $40,000,000.

There is, however, an offset to this total that the Commission did not take into account. This relates to reduced rates granted the government under Sec. 22 of the Interstate Commerce Act. This is discriminatory against private shippers but the practice has long prevailed. But the days when certain large shippers were allowed reduced rates, through rebates or otherwise, happily have passed.

THE steel industry and its raw materials constitute by far the greatest bulk of traffic hauled by the railroads. The Commission rated coal and coke as the most important group of commodities they handle. Ranking second is iron ore.





AMERICAN MONORAIL *System* Uses Power for SPOT Handling

Extreme flexibility of movement is carefully maintained in this hand operated American MonoRail System. Where quick change of trolley travel or passage of carrier through process is required, power driven equipment takes care of such spots as . . .

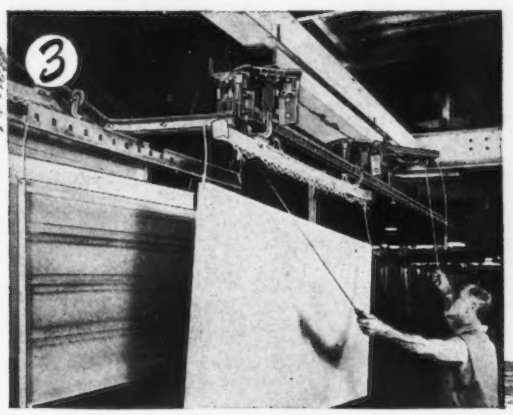
1. Trolleys on parallel tracks automatically brought into single track alignment by solenoid operated switch.

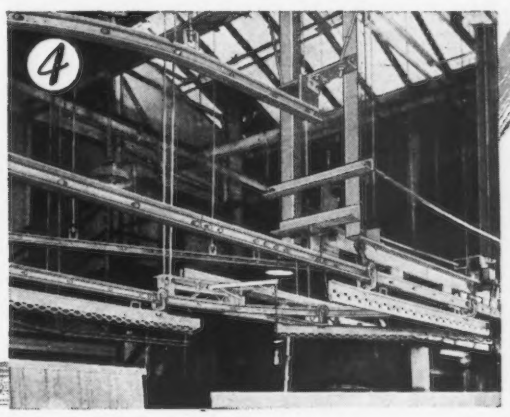
2. Carriers roll on track sections for *vertical* passage through degreasing tank. Cleaned parts move down the line to spray booths

3. Crosstrack switches provide 90° transfer to shipping area as carriers roll off power conveyor in finishing oven.

4. Empty carriers raised to high level track for gravity return to loading station.

American MonoRail Engineers, with their wide experience in solving difficult handling problems, will gladly consult with you. Send for Bulletin C-1 illustrating hundreds of similar operations.





THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVENUE • CLEVELAND 7, OHIO

Collectively the iron and steel commodities are the third most important group in point of tonnage and second as to revenue.

Coal and coke made up about 35 pct of the originated freight tonnage and yielded tbout 20 pct of the freight revenue in 1939-1941 and about 15 pct during the war years, 1942-1946.

The average annual movement of iron ore during the war years was about 100 million tons, yielding over $125 million. The 1947 volume is estimated at about 139 million tons.

In 1945 iron and steel products furnished about 99 million tons of traffic and $467 million in revenue.

NEW APPOINTEES: *Four new heads of Government agencies photographed at the White House after calling on the President. Left to right: Frank P. Creedon, Housing Expediter; John R. Steelman, appointed assistant to the President to help coordinate federal agencies; Maj. Gen. Philip B. Fleming, head of a new "Office of Temporary Controls" which will absorb OWMR, OPA, CPA and OES, and Raymond M. Foley, Housing Administrator.*

AFA Establishes New Washington Chapter In Response to Petitions

Chicago

• • • **Establishment at** Seattle of a Washington chapter of the American Foundrymen's Assn. has been approved by directors of the technical society in response to a petition signed by 72 Pacific Northwest foundrymen representing 36 companies.

The new chaper, AFA's fourth on the Pacific Coast and 34 in North America, was organized Oct. 3 at a Seattle meeting at which Sheldon V. Wood of Minneapolis, president of the association; W. W. Maloney, secretary-treasurer, and W. R. Pindell of Northwest Foundry & Furnace Works, Inc., Portland, Oregon chapter chairman, were guest speakers. Officers of the Washington chapter, elected unanimously at the organization meeting, are C. M. Anderson, Eagle Brass Foundry Co., chairman; George M. Rauen, Olympic Foundry Co., vice-chairman, and A. D. Cummings, Western Foundry Sand Co., secretary-treasurer. They are located in Seattle.

Directors named to serve until the first regular election include G. S. Schaller, University of Washington; C. W. Summerville, Seattle Brass Co., and J. D. Tracy, Salmon Bay Foundry Co., all of Seattle; E. D. Boyle, Puget Sound Naval Shipyard, Bremerton; V. C. Cretan, Atlas Foundry & Machine Co., Tacoma, and Howard Heath, Sumner Iron Works, Everett.

Interest in an AFA chapter in the Pacific Northwest became increasingly evident over the past year and many of the group's chapter members travelled 100 miles and more to attend the organization meeting, according to Mr. Maloney.

"It is expected," he added, "that the Washington chapter will be presented with the association's cast iron rattle at a formal installation meeting prior to the first of the new year."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

MEASURES THICKNESS CONTINUOUSLY WITHOUT TOUCHING THE WORK

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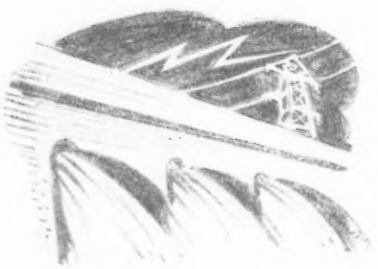
West Coast . . .

ROBERT T. REINHARDT

• Shipbreaking knots are all in government red tape—not in speed of operations . . . Renewed interest shown in electric furnace iron production.



SAN FRANCISCO—If anyone is interested in restoring the faith of some disillusioned purchasing agent of a western steel producer in the Santa Claus myth, all he need do is tell him where he can get a few thousand tons of scrap. It wouldn't be safe for Santa to make delivery, however—the p.a. would strip the reindeers of their sleigh bells for the metal.

Dealers' yards are almost as bare as the floors of steel warehouses and it is getting to be something of a contest as to who can complain the loudest—the producers looking for scrap or the steel users pleading for sheets.

Scrap collecting has been given some slight impetus by the increase in prices through the activities of the horse and wagon collector, but the fact remains unchanged that it just isn't being created as rapidly as the producer can use it. The coal strike, with its accompanying production curtailment, allowed some stocking of scrap at western plants, but the net result was negligible.

Even though shipbreaking admitedly isn't the complete answer to the scarcity, there is no question but that if the program were accelerated in the immediate future the relief afforded would be very important.

Local scrap buyers are frankly disgusted with the manner in which ships have been released and yards made available for shipbreaking. Strongly adopting the same attitude are local officials of government agencies concerned with the promotion of construction and home building, who maintain that if the government in Washington really wants to provide housing it should become more cooperative in helping the steel industry to get its raw materials.

Principal objections to the present snail-like progress being made in shipbreaking are based on three principal factors:

Ships are not being made available rapidly enough; facilities of the Maritime Commission or other governmental agencies are not being made available in sufficient numbers to help now; and would-be wreckers are discouraged by the high performance bonds required.

The highest estimate of the total tonnage of shipbreaking scrap made available on the West Coast since the close of the war is approximately 350,000 according to one of the top officials of the CPA. This figure includes both Maritime and Navy ships. This includes ships offered for breaking but which as yet are either unsold or tied up awaiting facilities for the scrapping operation.

Even accepting the above figure at its face value, it is insignificant when compared to the total West Coast demand of about 130,000 to 150,000 tons per month. The best estimate of the total tonnage being produced each month from shipbreaking on the Coast is 3500.

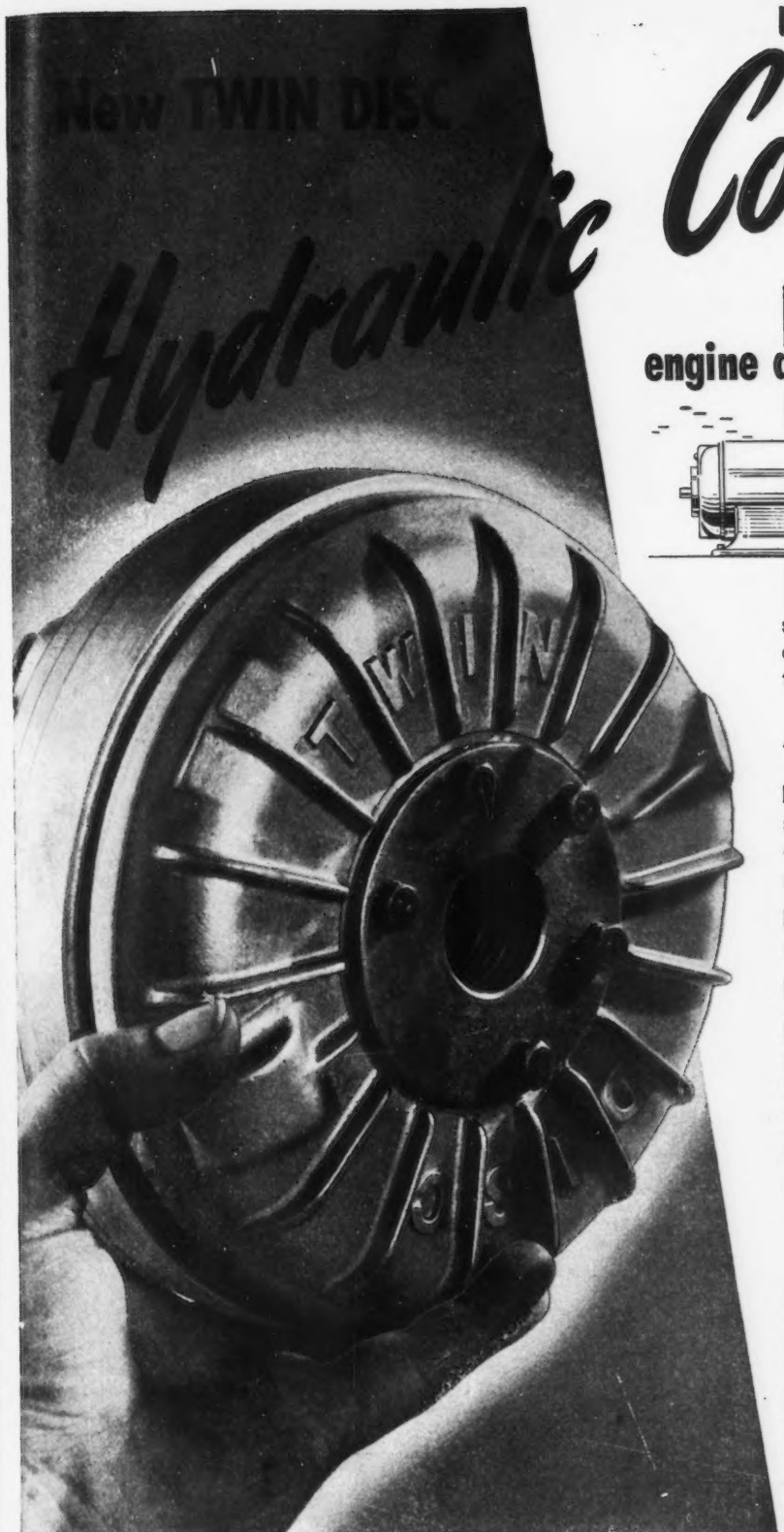
WHILE even the most nearly starved furnace operators aren't in sympathy with a wild and careless ship disposal program, it is hard for both them and others interested in maintaining a high production rate to understand the delay in getting rid of battle-scarred, worn-out and inefficient Liberty ships and even smaller craft. These observers point out these ships aren't like tired and faithful old horses turned out to pasture; they were built to do a job and that job is done. They believe a destruction line as efficient and fast as the pre-fab yards which built the Liberty ships could be set up to meet the present emergency without loss to the government. It is pointed out that these ships are probably worth more today as scrap than they ever will be again. As more automotive and production scrap becomes available, the less profitable shipbreaking will become.

The WAA comes in for a general shellacking because of the slow processes through which a possible shipbreaker must go to get the necessary facilities. This bureau is bound up in red tape which apparently can neither be unwound nor cut without an act of Congress. One yard in Stockton, Calif., declared surplus in April and cleared with the WAA in September, is still being negotiated for.

High performance bonds which the government maintains are necessary to insure proper and rapid handling of the scrapping operations and to keep irresponsible speculators from cornering the market on ships, is said to be keeping willing and capable contractors from entering the business of shipbreaking. Opinions are freely expressed that better ways of protecting the government's interest than asking bidders to put up bonds of several hundred thousands of dollars could be worked out and thus increase the number of operators in the field.

Richmond, Calif., shipyard No. 3, owned by the Maritime Commission and operated by Kaiser Co., Inc., during the war, is still without a long-term tenant and might offer opportunity for shipbreaking on a grand scale. Since the Commission's failure to rent the five-basin yard on its terms of 10 yr at $600,000 with the stipulation that it be used only for shipbuilding, there is some hope that the new advertisement for an occupant will permit shipbreaking operations and that the rent will be more in line with its peacetime potentials. The Kaiser interests are said to be interested in this possibility on a short-term basis.

BECAUSE of the acute scrap shortage, two representatives of the Norwegian builders of electric furnaces, Det Norske Aktieselskab for Elektrokemisk Indus-



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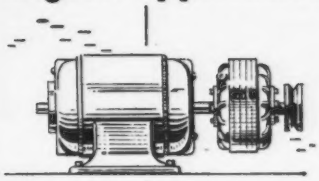

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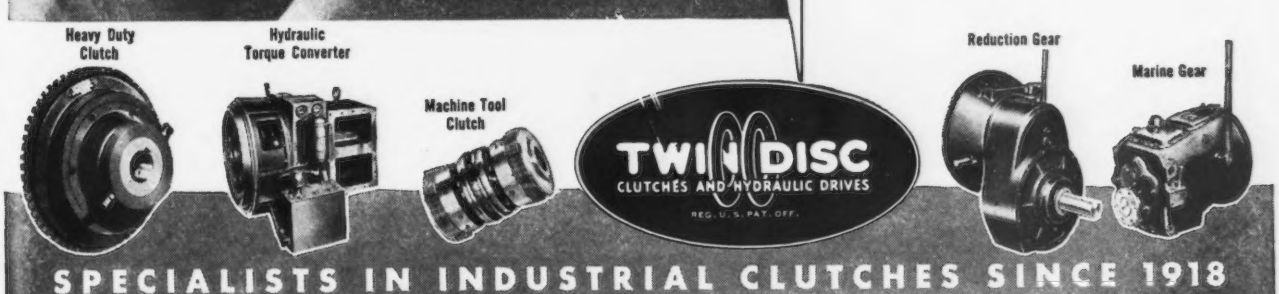
These advantages have been proved on larger Twin Disc Hydraulic Couplings of the same basic design in a wide variety of heavy-duty service. The complete line of Twin Disc Hydraulic Couplings is explained in Bulletin No. PR-10. Write for your free copy. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

tri, were given perhaps more than usual courteous attention on their recent coastwise trip. This company has been promoting the use of its furnaces for the reduction of iron ores into pig prior to 1928 and now has 14 of its Tysland-Hole furnaces in operation in Europe and Japan producing iron.

Western steel producers are interested because even low-grade iron ores and petroleum coke or almost any other form of carbon can be combined in these furnaces to yield a high purity pig, according to the manufacturers. Since all of the heat essential to the reduction process is provided by the electrodes the carbon is not used as fuel and it is stated that for every ton of pig iron produced only 800 ib of coke or its equivalent in carbon content is needed. Coke breeze is acceptable because no air blast is used and ore fines or sinter are commonly charged in present installations.

It is reported that in all installations in Finland ores containing as high as .5 sulphur have been charged and that the pig produced runs approximatel .03 sulphur because of the high temperatures developed.

Western electric power rates such as those of the Bonneville Power Administration in the Pacific Northwest are encouraging investigation of the process. It is reported that Harlan H. Bradt, Los Angeles, mining engineer, now engaged in a legal battle over the sale of the Iron Chief mines in San Bernardino county, had been considering such an operation at the mines. It is his contention that the low power rates in that area make such an operation economically possible and that the pig produced there would find ready buyers on the Coast or could be converted into cast iron pipe or steel at the furnace site. .

Since coking coal is at a premium on the Coast and petroleum coke still must prove its adaptability in a blast furnace, there is renewed interest in the electric furnace.

SPOKANE—Hope that the magnesium plant at Mead, near here, would soon again produce this light metal was raised with the announcement that the American Chrome & Magnesium Industries of New York and Morely & Associates of Seattle would bid on the surplus war plant.

Morely is reported to have patent rights on a magnesium reel used by wire rope, cable and electric wire manufacturers which is now being made by the Dow Chemical Co. at its Bay City, Mich., plant. American Chrome is said to have extensive holdings in Washington which will provide the dolomite for the ferrosilicon operation.

The Mead plant was built at the start of the war at a cost of approximately $20,000,000 with an annual capacity of 24,000 tons of magnesium per year. The proposed operation there would require approximately 18,000 tons of metal per year.

The ferrosilicon process is considered to be an extremely expensive way to produce magnesium and was resorted to early in the war only because of the dire need for the metal and its practicability was well established. Profitable operation of the process in competition with that of Dow or even that of The Permanente Metals Corp. in California with its higher costs, has been thought doubtful.

Morely is reported as also having put in a bid for the Renton, Wash., plant near Seattle which was recently abandoned by the Boeing Aircraft Co. and is to be offered as surplus early next year. It is planned to manufacture the magnesium reel there.

The aluminum industry here was given a boost with the start of operations of the aluminum plant at Baton Rouge, La., under 5-yr lease with option to purchase by The Permanente Metals Corp. Previously this operator of the Mead aluminum reduction plant here has purchased alumina from government reserves for use in four of its six potlines but is now being supplied from Louisiana. Full utilization of the Baton Rouge facilities will not be possible since, under government allotment of soda ash, production will be limited to 85 pct of Permanente's requirements at Mead.

John Garoutte, who during the war was in charge of the raw material units of Permanente's carbothermic magnesium plant in California, is production manager at Baton Rouge.

SORRY SPECTACLE: *This sad scene shows the effect of the coal strike on part of the openhearth department of the Homestead works of Carnegie-Illinois Steel Corp. where short coal stocks forced a sharp cut in operations.*

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Vickers Hydraulic Sequence and Check Valve.

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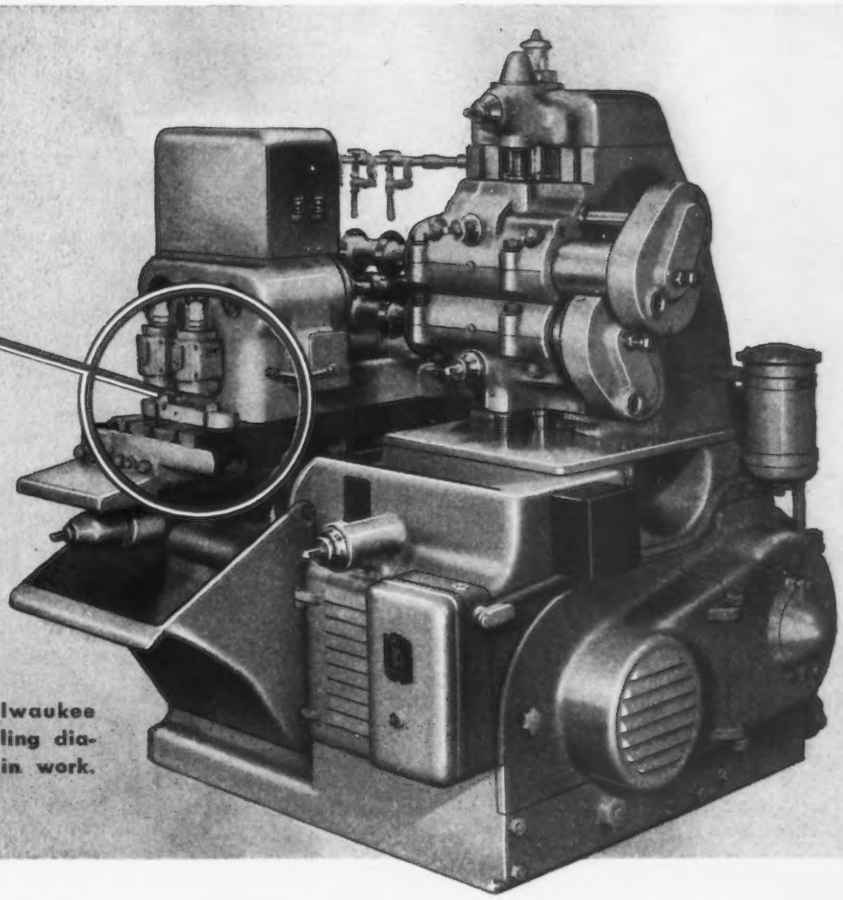

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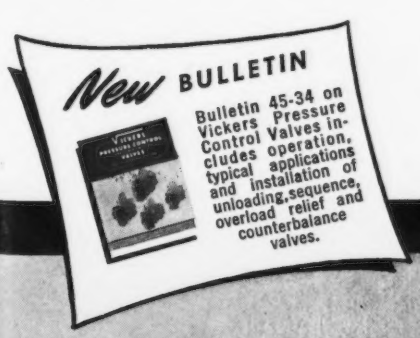

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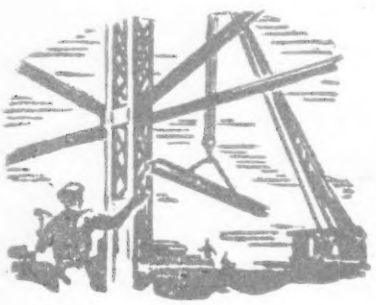
ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

European Letter

JACK R. HIGHT

• Monnet Plan for modernization of French industry specifies individual goals for basic industries . . . Sets steel output at million metric tons for 1950.



PARIS—After nearly a year's work by the various branches of the National Planning Council, the "Monnet Plan" for the modernization of French industry and agriculture has now been published and is regarded as a major contribution to the plans for rebuilding the French economy.

The plan which Jean Monnet sponsored is a series of detailed recommendations aimed at raising the quantity and quality of France's industrial and agricultural production so as to enable the country to achieve economic independence by 1950. The objectives for the French economy in 1950 are outlined in the plan as well as precise programs for the years 1947 to 1950. Individual goals for the basic industries concerned are specified, and an outline is given of a proposed program of production, modernization, investments, imports and exports. Methods of bringing various segments of the program into execution are also proposed.

The commissions which have prepared the Monnet plan have included broad political representation, and the proposals are brought forward as a collective work, with the flat statement from Mr. Monnet in a press conference held here that irrespective of the political character of the new French Government the unhealthy French economy must embark on such a program.

"France is now at the crossroads," said Mr. Monnet. "If she can modernize her industry, she can increase rapidly her capacity of production and the productivity of her labor.

"If, on the contrary, by lack of confidence in the quality of her men and resources she abandons herself decay is certain. Time is limited. It is immediately that we must take the road of salvation."

THE recommendations cover a wide field, but are concerned mainly with the six basic sectors of French economy: coal, steel, electricity, cement, agricultural machinery, and transport. It is planned to raise steel production to 11 million metric tons per year by 1950 and coal to 65 million metric tons. The plan proposes for 1947 the production of 55.5 million metric tons of coal, 7 million tons of steel and 26 billion kw of electricity.

On the basis of the October output the annual rate of iron and steel production is around 5,800,000 metric tons, which is approximately 50 pct of the rated annual capacity of the French iron and steel industry, and 84 pct of the 1938 total. The objectives fixed by the Monnet plan for the end of the year would more than likely have been attained had it not been for the reduction of the coal and coke supply from the Ruhr, the strikes in the U. S. coal mines, and difficulties regarding deliveries of Polish coal which will have an adverse effect on output during the next two or three months.

The problem as far as the iron and steel industry was concerned was much more a matter of organization and modernization rather than expansion. Existing facilities are theoretically able to produce 12 million metric tons of steel if fuel and manpower were available, although costs in many units would be noncompetitive.

The general report of a technical character on the steel industry emphasizes the urgency and the complexity of the coal problem. The concentration of production in larger units is specifically recommended so as to reduce consumption of both fuel and manhours of labor. The lack of balance of present production is to be corrected, reducing the overcapacity for rails and heavy sections while constructing two continuous hot strip mills to increase the output of light gage flat rolled items.

AS previously reported (THE IRON AGE, Nov. 14, p 116, and Nov. 21, p 119) one of the mills is to be located in the north at Denain and the other in the east. In the Longwy area big concentration is anticipated involving the Mont Saint Martin works, the Chiers works, and eventually the Senelle-Mauberge works. A new power station is to be erected at Herserange and the capacity of the coke ovens of the Mont Saint Martin works will be developed to 1500 tons per day. The Micheville works will remain substantially as they are at present. Also in the east at the Knutange and the Homecourt works there are still certain problems to be studied, as there are at the Neuves-Maisons works and at the Pompey works.

With reference to those mills located in the center of France, the iron and steel committee of the commission proposes the formation of four groups, with the Creusot, Geugnon, Montlucon, Commentry works; the steelworks of the Loire with Assailly, Saint-Chamond, Firminy, Marrel, Saint-Etienne works; the Alpes steelworks; and the Pyrenean steelworks. These groups would be specialized in the production of high quality special and alloy steels.

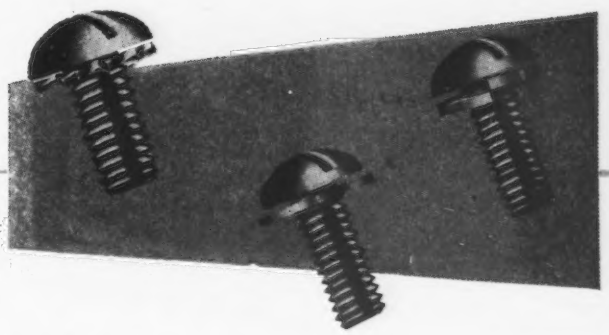
The program proposes the erection of nine new coke oven batteries, 24 blast furnaces, two new basic bessemer steelworks, eight new openhearth furnaces, and also important new electrical equipment. As previously reported, the proposal is to invest 70 billion francs. The Monnet plan insists on these investments to make up for 20 yr of progress of which it is now short.

The report concludes that during the next ten yr the French iron and

always in balance

s to count, size,

nd quality



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Providence, R. I.

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Chicago, Ill.

steel industry must invest each year in the following:

(1) Normal amortization progressing from 9 million to 11.25 million francs.

(2) Financing of the new equipment amounting to 4.5 billion francs. A part of this sum could be provided by increases in capital of the companies and the remainder by loans.

THE proposed import of equipment includes for the steel industry a total of 12 billion francs, assuming June 30, 1946, prices. The imports of raw materials are put at:

(Billions of francs)	1938	1946	1947	1950
Coal	26.5	13	22	27
Steel products	0.8	6	5.5	—
Minerals and metals	12.2	17	16	21

For 1947 investments are put at 2 billion francs for buildings and civil engineering, and 5 billion francs for machinery and installations. Though the modernization committee report fixed a total investment of 33 billion francs through 1950 without indicating if cuts have been made on the program proposed by the modernization committee, or if the rest of the investments will be made following 1950.

The figure of 33 billions given in the report is broken down as follows, given on the basis of June 1946 prices: Reconstruction on 4 billion francs; maintenance arrears owing to the war 10 billion; modernization and increase of capacity 19 billion. On the basis of types of construction the breakdown will be 9 billion for buildings and civil engineering, and 24 billion for machinery and installations.

Balancing of the budget, sound finances, strong government, an 8-hr increase of the work week to 48 hours, American credits, and the necesary soft discipline for the execution of the plan are specified by Mr. Monnet as necessary conditions for the ultimate execution. Unfortunately in the France of today even these conditions may not be sufficient. It will be submitted to the new government immediately, but will find their strong support inasmuch as the powerful workers' confederation has already endorsed the program.

IT has been announced by the British that the total coal exports from the Ruhr will be reduced by 350,000 metric tons in December, and this reduction will affect the French iron and steel industry severely as it depends to a large extent on coke and coal deliveries from the Ruhr. French officials hope that British efforts to increase the Ruhr coal production will prove successful and that the surplus obtained in the next months will be available for exports. Meanwhile, with the discussions going on about the reshaping of the British policy in Germany, the controversial question regarding the use of low-grade iron ores for German blast furnaces may be approached from a new angle and lead to changes in the Ruhr iron ore supply and coke exports from Germany.

The coke consumption for smelting German low-grade iron ores is very heavy, and it could be much reduced by mixing with the high-grade foreign ores, and still more by using only high-grade ores in some works as before the war. The saving of coke would make more available for export in countries where it is urgently needed, and foreign iron ores would not be difficult to find in the present circumstances.

It has been suggested by the British that the return of German prisoners of war now working in Belgian and French mines, numbering about 40,000 and 50,000 respectively, would be of great assistance in the Ruhr mines which are more productive than other Western European coal mines and the Belgians have already agreed to release some of their German prisoners working in the mines. Those whose output is at least 80 pct of that of a Belgian miner will be released first, and to balance the consequent labor shortage the Belgian government has proposed taking in exchange for German prisoners displaced persons from Esthonia, Latvia or Lithuania who are still staying in Germany.

The American strikes will naturally delay the agreement reached with Belgium regarding the coking of American coal in Belgium for the French ironworks, which would have given an additional 55,000 metric tons of coke to France per month. The French coal supply during the next few months is also liable to suffer from an interruption in the delivery of Polish coal. The Polish government has asked for an increase in the price of coal deliveries to France because the prices of manufactured products received in exchange have increased during the past few months. It has already announced that exports will be reduced and may stop altogether during December.

A joint committee, according to the clauses of the French-Polish agreement of Aug. 1, will meet this week to arbitrate the case. Though Polish exports comprised a relatively small amount of coke or of coking coal, the effect of a reduction would diminish the amount of coal available for the French needs and may necessitate a reduction of coking coal grade to the steel industry which would be allocated to other industries or services. At the same time the electricity supply is short, and cuts of power are made two days a week alternatively by region or quarter in the Paris area. In spite of these difficulties, it is hoped that they are only temporary during the winter period, and that the French plans of development will not suffer drastically from this crisis.

Financial circles are showing increasing interest in the concentration plan of the North and East and Denain works, and the recently proposed increase of capital of the two companies has improved their share quotations on the French stock exchange. It has been announced that discussions are still taking place regarding the formation of a joint subsidiary belonging to the two companies.

French iron ore stocks have increased during the past few months, totaling 7,500,000 metric tons at the end of September. Manganese ore is coming from French Morocco, and the Bou-Arfa mines exported 10,320 metric tons in October against 4000 tons in September.

Discussions are taking place regarding suppression of the laws imposed during the war, according to which prices and salaries were fixed by the government, but the present situation may lead to a renewal of the powers of the government. The workers unions and employers associations are agreeable to returning to the prewar system of collective contracts ruling the salaries and conditions of employment. A decision on this point is awaited from the government. Prices are still increasing, and the wage increase from 25 pct to 30 pct in July last is far behind the progress in the cost of living during the past few weeks.

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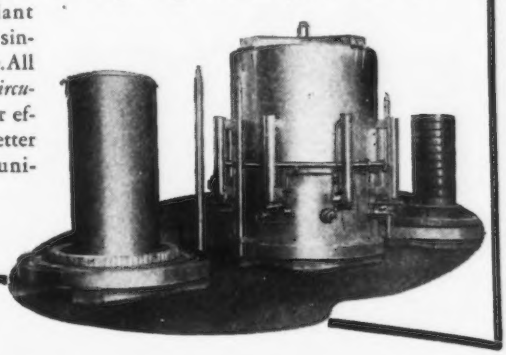

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RAYMOND R. LEONARD, president, Sun Tube Corp.

• **Raymond R. Leonard** has been elected president of Sun Tube Corp., Hillside, N. J. He succeeds **Willis M. Rose,** who has retired. Mr. Leonard has been for the past year plant manager of the Hillside plant of Bristol-Myers Co., of which Sun Tube Corp. is a wholly-owned subsidiary. He became associated with Bristol-Myers in 1943 as director of plant personnel.

• **Robert A. Wahl** has been appointed sales manager of Union Steel Castings Div. of Blaw-Knox Co., Pittsburgh. Mr. Wahl has been with the company since 1937, having served in a number of purchasing and sales capacities.

• **Edward A. Sipp** has been appointed manager, railway division, Reynolds Metals Co. Headquarters for the division, previously called the railway supply division, are in Chicago. Prior to joining Reynolds in July 1946, he was with the Gustin-Bacon Mfg. Co. as contact executive.

• **J. D. Connor** has been appointed district manager at **St.** Louis of the superior engine **division** of the National Supply **Co.** Mr. Connor started with National Supply in 1935.

• **Dan J. Sheehan** has been appointed manager of the Danville, Ill. plant of the Hyster Co. He was superintendent of motive power for the Chicago and Eastern Illinois R.R. in Danville for the past 14 yr.

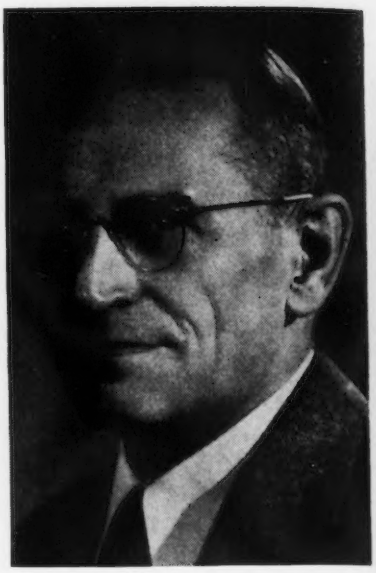
HARRY B. COEN, whose appointment as vice-president of General Motors Corp. was announced in the Dec. 12 issue.

• **Lloyd E. Tracy** has been elected vice-president of Oil Well Supply Co., U. S. Steel subsidiary, Dallas. Mr. Tracy retains the position of general manager of sales. He came with Oil Well Supply Co. in early 1935 from National Tube Co., having started with National Tube in 1927.

• **R. B. Tripp,** formerly vice-president of the Ohio Forge & Machine Corp., Cleveland, has been elevated to the office of executive vice-president. **T. E. Leighton,** formerly secretary and treasurer, has been made vice-president and treasurer. **C. E. Thayer** was promoted from assistant secretary to secretary of the corporation.

• **John L. Lang** has joined the staff of Lukenweld, Inc., Coatesville, Pa., a division of Lukens Steel Co., as welding engineer. For the last 5 yr he has been with the New York Shipbuilding Corp., Camden, N. J., as supervisor of chemical and metallurgical laboratory and as assistant to the welding engineer.

• **M. H. Clarke** has been appointed vice-president and director of manufacturing of the Dayton Rubber Mfg. Co., Dayton. He was previously associated with Lake Shore Tire & Rubber Co.

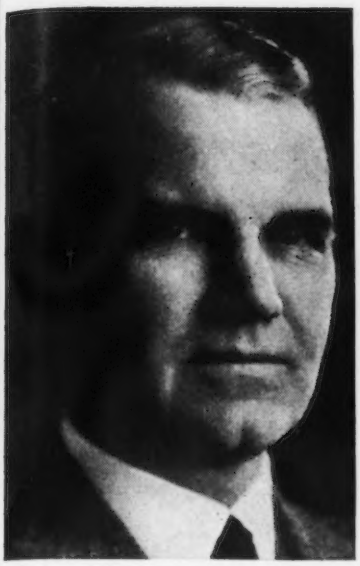


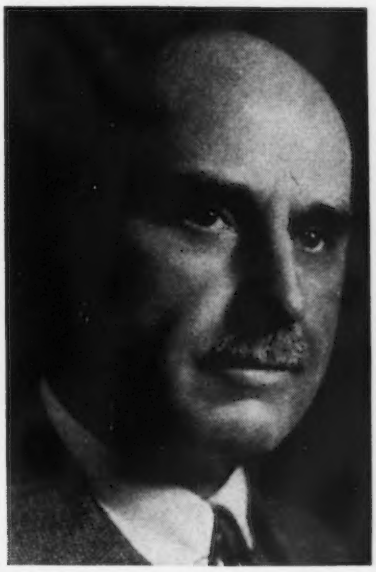
WILLIAM K. BONTE, chief industrial engineer, Republic Steel Corp.

• **William K. Bonte** has been appointed chief industrial engineer, Republic Steel Corp., Cleveland. succeeding the late **Elmer Kropp,** who died Nov. 16. Mr. Bonte has been acting chief industrial engineer for the past 10 months. For the past 25 yr he has been associated with Central Steel and Republic Steel Corp., with which Central Steel was merged in 1930, in supervisory capacities, principally in the accounting department. From 1931 to 1936 he was works accountant for the Youngstown and Warren districts. In 1936 he was transferred to the staff of the comptroller of Republic Steel Corp.

• **A. S. Glossbrenner** has been elected assistant vice-president in charge of steel operations under J. L. Mauthe, vice-president in charge of operations, of Youngstown Sheet & Tube Co., Youngstown, Ohio, effective Jan. 1. Mr. Glossbrenner has been general superintendent of Youngstown district manufacturing properties more than 3 yr. **H. E. Englebaugh,** assistant general superintendent, Youngstown manufacturing properties, will become manager of Youngstown district operations, effective Jan. 1.

• **Lee G. Miller** has been appointed plant manager of all operations of Lebanon Steel Foundry at Lebanon, Pa. He was formerly superintendent, and takes the place of **Frank J. Stanley,** resigned. Mr. Miller has been with the company 20 yr.





R. C. TODD (left), DR. ANSON HAYES (middle), and G. F. AHLBRANDT (right), vice-presidents, American Rolling Mill Co.

• **R. C. Todd, Dr. Anson Hayes** and **G. F. Ahlbrandt,** have been elected vice-presidents of American Rolling Mill Co., Middletown, Ohio. Mr. Todd entered the company's sales division in 1904. In 1911 he was placed in charge of sheet steel sales and in 1917 was made district manager at the company's Detroit office. He returned to Middletown as assistant general manager of sales in 1925 and in 1931 became assistant vice-president. Dr. Hayes has been with Armco for 18 yr, joining the company in 1928 as chief chemist of the research staff. He was made director of research in 1929. Mr. Ahlbrandt was first associated with Armco 42 yr ago as a chemist in the openhearth department. He became assistant superintendent of the department in 1907 and entered the culvert sheet sales department in 1909. He became manager of sales in 1918 and in 1937 was given the responsibilities of assistant vice-president. **Clarence G. Roll** has been appointed purchasing agent of the Ashland, Ky. division of the American Rolling Mill Co. He began his long association with Armco in 1919 and became acting purchasing agent in August of this year. In this new assignment he replaces **C. J. Moegling,** who recently died after 23 yr as the division's purchasing agent.

• **Edwin F. Brown,** grain engineer of Norton Co., Worcester, Mass., has retired after 29 yr service.

• **Arthur F. Peterson** has been appointed general manager, raw materials properties, Bethlehem Steel Co., Bethlehem, Pa. **Sheldon J. Shale,** superintendent for the past 2 yr of the ore concentrator plant in Lebanon, Pa., has been made manager of the Cornwall Ore Div. of the company, the post Mr. Peterson leaves. Mr. Peterson has been employed by Bethlehem Steel since 1924, when he came to Cornwall as superintendent of Cornwall Mines.

• **Barton I. Hogarth** has been named to the newly-created position of purchase engineer in the equipment and supplies division of the Pennsylvania Salt Mfg. Co purchasing department, Philadelphia. He came to Pennsalt from the Manhattan district project and formerly was associated with the Carbide & Carbon Chemical Co.

• **Kenneth E. Lyman** has joined the Tucker Corp. as technical adviser to the president, Preston T. Tucker, at the old Dodge Chrysler Chicago plant. Mr. Lyman has served 5 yr as technical assistant to Vincent Bendix and 10 yr as technical assistant to C. S. Davis, president of Borg-Warner Corp. He also spent 3 yr as head of the engineering department of DePaul University and subsequently worked for Doble Steam Car Co., Mitchell Motors Co., Studebaker Corp. and Cadillac Motor Car Co.

• **S. B. Withington,** former assistant to the president of the J. I. Case Co., Racine, Wis., has been appointed vice-president in charge of manufacturing, to include the two Racine plants and those at Rock Island and Rockford, Ill., and the plant planned for Bettendorf, Iowa.

• **Ray H. Morris** has resigned his position with Hardinge Bros., Inc., Elmira, N. Y.

• **Albert C. Walsh,** purchasing agent of the Timken Roller Bearing Co., Canton, Ohio, has retired. He joined the Timken firm when it purchased the assets of the Gilliam Mfg. Co., with whom he was then employed.

• **Harold S. Silver** has been appointed general patent attorney, legal division, Allis - Chalmers Mfg. Co., Milwaukee. He has been associated with Allis-Chalmers since 1933 and prior to that served with the U. S. Patent Office.

• **Edward T. McBride** will be in charge of the new Cincinnati sales office of Monsanto Chemical Co. plastic division, which will be opened Jan. 1. Mr. McBride started with Monsanto last April, following his discharge from the Army. The sales territory will cover parts of Ohio, Indiana, Kentucky, Tennessee and Pennsylvania and all of West Virginia.

• **Frank M. Clark,** insulation expert at the Pittsfield, Mass. works of the General Electric Co.'s apparatus department and assistant engineer of the works laboratory there, has been named technical consultant on insulation of the entire apparatus department.

• **Francis J. Wakem** has been appointed vice-president of Johns-Manville Sales Corp., New York. He will also continue as merchandise manager of the industrial products division. Mr. Wakem began his association with Johns-Manville in 1921.

• **George A. Collin** has been appointed to the recently-created position of controller of the H. K. Ferguson Co., Cleveland. He had been associated with the Bureau of Internal Revenue for the past 8 yr.

• **Charles H. Caldwell** has been appointed manager of advertising and sales promotion for the recently-created shoe products sales division of the B. F. Goodrich Co., Akron, Ohio. He has been with the company since 1944 in the sales promotion department.

• **Harvey E. Golden,** formerly general sales manager of the Florence Stove Co., Gardner, Mass., has been made vice-president to succeed **Henry H. Morse,** who has retired after 22 yr association with the company. **Robert H. Taylor,** formerly New York division sales manager, becomes general sales manager, while **George A. Quinlan,** heretofore Chicago representative, takes Mr. Taylor's New York position.

THOMAS J. WALNE (left), vice-president and general manager, and E. M. GRETZLER (right), vice-president in charge of export sales, National Supply Export Corp.

• **Thomas J. Walne** who has been division engineer of the National Supply Export Corp., New York, a subsidiary of the National Supply Co., has been appointed vice-president and general manager, and **E. M. Gretzler** has been named vice-president in charge of export sales. **L. V. Boggs,** who established the export department that later was incorporated as the subsidiary of National Supply, has retired but will remain with the corporation in an advisory capacity. He has been with the company for 26 yr. Wr. Walne joined the National Supply Co. in 1943. For 2 yr he was located in the Toledo offices of the company and last year became division engineer of the National Supply Export Corp. Mr. Gretzler, vice-president in charge of export sales, joined National Supply in 1919. In 1927 he was manage of the company's branch in th Ploesti oil field in Romania, re turning to New York in 1937 t become manager of export sales

• **Samuel Prescott** has been ap pointed general office manage credit manager and controller o Jules Alexandre, Inc., of Harris burg, Pa., distributors of Crosle products. Prior to joining th organization, Mr. Prescott was em ployed as office manager and chie accountant for the Pennsylvani Milk Products Co.

• **John J. Wild** has been ap pointed sales manager of the Pot ter Instrument Co., Flushing N. Y. Preceding his association with Potter Instrument Co. h was assistant sales manager o the television equipment sale section of General Electric Co.

...OBITUARY...

• **P. S. Bosworth,** 52, in charge of sales for the galvanizing division of the Nashville Bridge Co., Nashville, Tenn., died Dec. 3. Mr. Bosworth worked out of the company's Bessemer, Ala. offices.

• **Prof. Henry H. W. Keith,** 67, a consultant at the Quincy, Mass. plant of the Bethlehem Steel Co. for 25 yr, died Dec. 3.

• **E. Russell Enberg,** 49, production manager of the Wright Machine Co., Worcester, Mass., where he had worked 30 yr, died Dec. 4.

• **Sidney W. Wray,** 55, sales manager of the Washburn Wire Co., Phillipsdale, R. I., died Dec. 1.

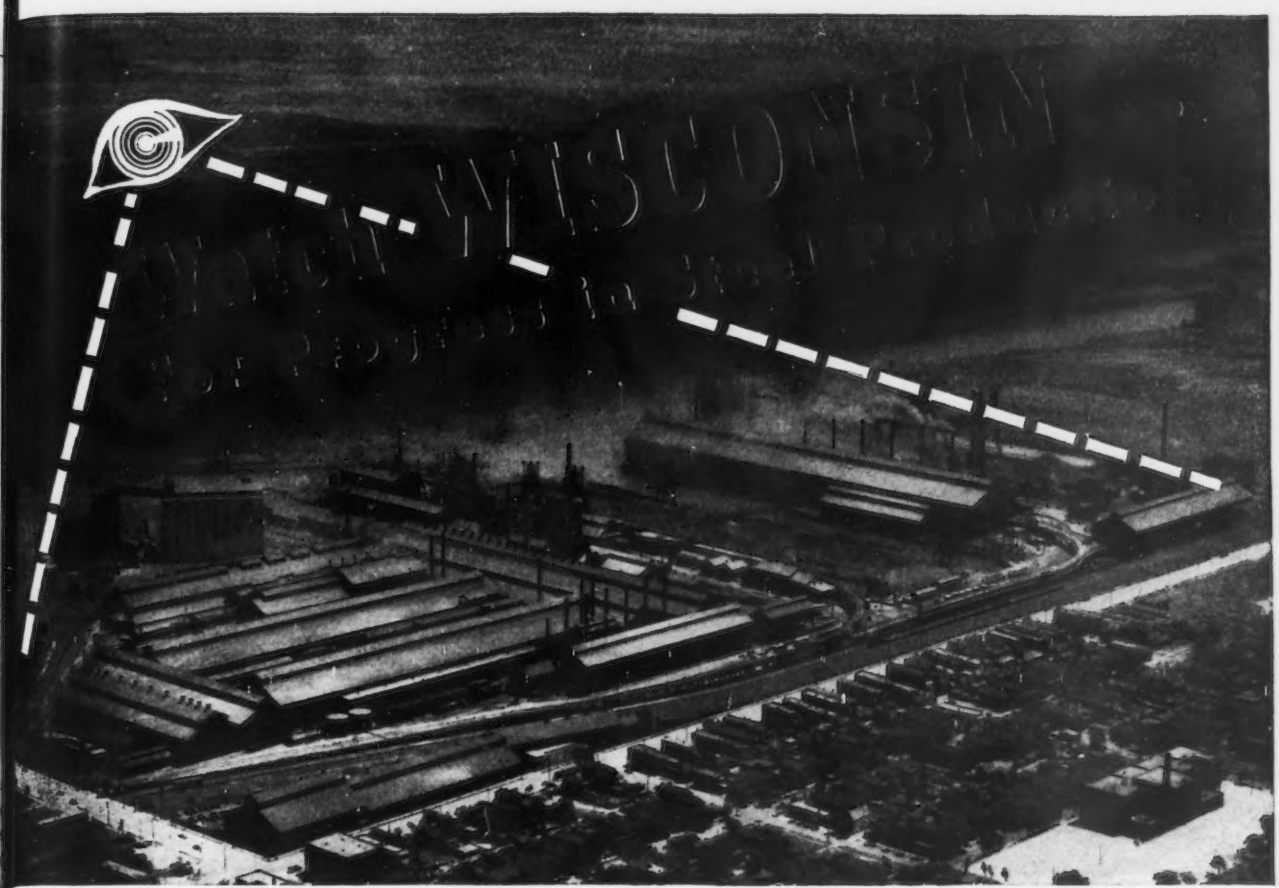
• **Arthur M. Jorgenson,** president of the Hancock Tool & Die Corp., Detroit, died recently.

• **Harry E. Barrows,** 74, chairman of the board of the Dillingham Mfg. Co., Sheboygan, Wis., died Dec. 2 of a heart attack.

• **W. Scott Long,** 60, Chicago sales representative for the Briggs & Stratton Corp., Milwaukee, died Dec. 1 after several months' illness.

• **Walter O. Kurtz,** secretary-treasurer of the Peninsular Steel Co., Detroit, died suddenly in Cleveland on Dec. 1.

• **Clarence R. Hocmuth,** 52, plant manager of the Kearney & Trecker Co., Milwaukee, and an employee for 34 yr, died Nov. 30 after a short illness.



YOUR steel requirements can best be served by a progressive, superbly staffed, completely integrated steel producer. WISCONSIN is exactly that.

Progressive is more than a word at WISCONSIN. It's a *fact* that has been demonstrated by our development of Sulfite-Treated Steel—the highly machinable steel that overcomes the faults of resulphurized steels. "H" steels of guaranteed hardenability are a specialty of ours. Both of these steels are earning wide acceptance and acclaim.

Superbly Staffed by top-flight steelmen, WISCONSIN has one prime objective: to make the best possible steel for our customers. Every man in the mill works toward that goal.

An Integrated Organization gives WISCONSIN complete control of the product from the ore mines to the customer. That control means finer steel.

Watch WISCONSIN for steel progress. We can't supply all the steel our customers need but the picture is improving. We haven't compromised with quality. Our sales and metallurgical staffs are ready to serve you.

WISCONSIN STEEL OPERATIONS

Ore Mines • Coal Mines • Ore Freighters
Blast Furnaces • Open Hearth Furnaces • Rolling Mills
Heat-Treating, Cold Finishing and Annealing Facilities

WISCONSIN STEEL COMPANY
(Affiliate of International Harvester Company)
180 North Michigan Avenue **Chicago 1, Illinois**

WISCONSIN STEEL

Dear Editor:

REVERBERATORY FURNACES

Sir:

I have read with considerable interest the article on the disposal of aircraft aluminum, published on pp. 104 and 105 of the Dec. 20, 1945, issue. I wish to have details of the sloping hearth reverberatory furnaces mentioned in the article and shall be grateful for any further information you can send me.

K. N. P. RAO
Technical Assistant
Board of Scientific & Industrial Research
Jamshedpur, India

● Particulars of the sloping hearth reverberatory furnaces may be obtained by writing to Capt. H. C. Stoa, Supply Officer, Jacksonville Naval Air Station, Jacksonville, Fla.—Ed.

RUST RESISTANT STEEL

Sir:

Can you help us on an inquiry which was received from a manufacturer located in the Erie, Pa., area on the following: "It is our understanding that special steel is used in chutes and conveyors in quarries, this steel being of a special alloy to resist abrasive wear. We would like to know more about this material. . . ."

W. B. FOLEY
Associate Director
Research Advisory Service
Liberty Bank of Buffalo
Buffalo

● 18-8 type stainless steel has been successfully used in chutes and conveyors in coal mines. This type of steel offers the advantage of longer wear and also decreases the possibility of clogging from wet or damp materials, it is claimed. We are listing manufacturers of this type of steel for your information.—Ed.

ELECTRODE CHART

Sir:

We have recently seen a chart on the comparison of various electrodes in the welding field today. It has also come to our attention that this chart, or a chart similar in structure, has been issued by your publication. This chart would prove invaluable to us who are distributors in the welding field, and we would appreciate any information that you have with reference to obtaining the literature.

S. J. KARLIN
American Industrial Equipment Corp.
Union City, N. J.

● We have published a "Comparable Arc Welding Electrode Chart," which is available to readers at 20¢ a copy.—Ed.

SECONDHAND MATERIALS

Sir:

We would appreciate your sending us the addresses of dealers or suppliers of secondhand or reconditioned materials, such as machines of all varieties; galvanized iron pipes; boiler tubes; girders; oil engines and spare parts; boilers and spare parts; files; iron and steel rounds; plates; motor spare parts, etc. Addresses of suppliers of the following new items are also needed: Fountain pens, optical frames, steel butts, cut tacks, panel pins, galvanized iron sheets; malleable iron pipes, etc.

EAST INDIAN TRADING CO.
Tilak St.
Nellore, S. India

● A list of used and reconditioned machinery dealers is being forwarded to you, together with sources for the other parts you mention. May we suggest that a close perusal of the editorial and advertising pages of THE IRON AGE will keep you abreast of the machinery markets.—Ed.

NEW PRODUCT DESIGN

Sir:

Allow me to compliment the publication of the informative article, "So You're Designing a New Product!" by George K. Hendrick. We would like 50 reprints of this article for distribution.

GEORGE W. BACH
President and General Manager
American Sterilizer Co.
Erie, Pa.

● Enthusiastic reader response to Mr. Hendrick's down to earth discussion has made it necessary to make reprints of the article to fill requests for additional copies. The copies you request will be forwarded as soon as they are available.—Ed.

DOUBLED PRODUCTION

Sir:

Could you please send us a copy of the article by Mr. Imhoff which appeared in your Aug. 8 issue and was entitled "Hot Air Dryer Doubles Galvanizing Output."

GEORGE C. PRICE
President
Electrical Mfg. Co.,
Battle Creek, Mich.

IRON-COPPER COMPACTS

Sir:

I was very much interested in your article in the Aug. 15 issue on iron-copper compacts and will appreciate receiving a reprint of it.

W. J. BAEZA
Industrial Research Co.
New York 17

● Tear sheets of the article "Properties of Sintered Iron Copper Powders" have been forwarded.—Ed.

TOOLS FOR THE BLIND

Sir:

We are writing to express our appreciation for the excellent article on p. 56 of the May 23 issue, relating to the special height gage and vernier caliper which we developed for use by the blind. As you are aware, these instruments were developed at the request of our (British) Ministry of Labor and National Service and the National Institute for the Blind, to facilitate the rehabilitation of war wounded, both civilian and service man, who had had previous experience with the more conventional type of instrument. The fact that they received recognition in a journal of such high international repute as THE IRON AGE is particularly gratifying to us on this side of the Atlantic.

K. GRAHAM SMITH
Director
British N.S.F. Co., Ltd.
Keighley, Yorks, England

CRUSH GRINDING

Sir:

Will you kindly forward a copy of the article, "Production Experience Proves Economy of Crush Grinding," by C. J. Linxweiler and R. Y. Moss, which appeared in the Aug. 29 issue.

G. BRUCKNER
Bell & Howell Co.
Chicago 18

ALUMINUM POTS

Sir:

We will appreciate any information you can give us regarding methods of welding and polishing spouts on aluminum pots, to give a continuous smooth surface, and lists of manufacturers making machinery and equipment for this purpose. Also can you furnish names of manufacturers making rolling, spinning or press equipment to fabricate aluminum pots, such as coffee percolators, which have smaller diameters at the top than at the bottom?

E. CONDAK
Mardigian Corp.
Detroit

● For the forming or spinning operations on your product, we are forwarding names of companies who manufacture presses capable of handling the work, as well as several specialists in metal spinning equipment. As regards the welding operation, since this will depend to a great extent on the type of welding you prefer to use, we are listing both gas and electric welding companies, any of which would be in a position to advise you as to the best method of attaching spouts and cleaning and smoothing the weld.—Ed.

MILD STEEL STRIP

Sir:

Could you kindly help us by indicating a source of supply for mild steel strip of deep drawing quality, annealed, lead plated, with the following specifications: 50 x 0.16 mm, 35 x 0.12 mm and 20 x 0.10 mm. These strips would be required in reels of about 30-in. diam, 100 tons per annum.

C. W. BARK
Vice-President
Samuel Osborn (Canada) Ltd.
Montreal

● Thomas Steel Co., Warren, Ohio, produces the type of strip you are interested in and we suggest you submit your requirements to them.—Ed.

Industrial News Summary...

- **Steel Ingot Rate Climbs 14.5 Points**
- **USWA to Keep Wage Demand Under Cover**
- **Scrap Prices Advance $4 to $5 a Ton**

STEEL ingot output this week staged a further substantial comeback from the effects of the coal strike when the industry raised its rate 14.5 points to 85 pct of rated capacity. Next week some mills may shut down for the Christmas holidays which would prevent the industry rate from reaching the prestrike level of 91 pct of capacity.

While steel company officials view the rapid pickup in steel activity with satisfaction, this feeling has not overcome the realization that close to 16 million tons of steel production was lost this year due to steel and coal strikes. It is estimated that total steel ingot output this year will run to approximately 65,900,000 tons or more. Had it not been for the steel and coal strikes, output would have ranged between 80 million and 83 million ingot tons.

Over the next few weeks steel consumers and steel producers will have their fingers crossed over the possible outcome of the steel wage negotiations. In direct contrast to its stand at the beginning of this year when the United Steelworkers of America made a flat demand of a 25¢ an hr increase, the union, following policy meetings being held in Pittsburgh this week, is expected to keep its specific wage demand under cover until direct negotiations are begun with steel officials.

IT IS a good possibility that Mr. Murray's steelworkers may ask steel management to make the first offer and it is also probable that for the first time since the war began a sincere attempt will be made to carry out real collective bargaining. The steel companies, while in a position to increase prices to the amount necessary in order to compensate for higher wages, may be reluctant to take such action in view of the price adjustments which have been made during the past 2 weeks.

While the chances that there will not be a national steel strike in the near future are much better than was the case a year ago, any stalemate between the steel union and the management over what the former considers an adequate wage offer could very easily turn the steel labor situation into a very serious one with the prospect of a definite steel industry shutdown. Whether or not conditions become that grave must await the trend of negotiations when the initial meeting between steel officials and union leaders takes place in January.

A second phase of steel union demands is expected to encompass a broad social security program. This may take the form of specific demands covering a health-and-welfare fund, a guaranteed annual wage and revisions or establishment of pension programs. Another important item which the union will push to the utmost will be its demand for a continuation of maintenance of membership which involves the checking off of union dues by the steel company from the employees' pay envelope. Some steel officials in the past indicated that this phase of past union contracts would be fought in the postwar period, but the union, it is understood, will resist such action with all its force.

WITHOUT fanfare or even public announcements many steel companies during the past week made further increases in the prices of those steel products on which a low return was claimed. Most companies early this week had advanced or were about to advance the price of merchant steel bars $2 a ton and similar action was taken on concrete reinforcing bars. For months producers of reinforcing bars had complained to OPA that the price of this product should be advanced. It is noted, however, that producers have continued the differential between merchant steel bars and concrete reinforcing bars which existed prior to the latest advance.

The nation's railroads will pay more for their rails and track accessories in 1947, the price of these items having been advanced late last week by some producers and early this week by others. Standard rails over 60 lb which a week ago were priced at $43.39 a net ton are now being sold on the basis of $2.50 a 100 lb or 50 a net ton, an increase of $6.61 a ton. Angles and splice bars which a week ago were being sold for $2.85 a 100 lb are now priced at $3 a 100 lb. Tie plates were advanced $5 a ton.

The result of the most recent advance has taken THE IRON AGE finished steel composite price from 2.72122¢ per lb to 2.75655¢ per lb or an increase of approximately 71¢ a ton. Additional advances on some other steel products are expected over the next few weeks, although the most important adjustments have been made in the base prices and in the extras. Because of revisions in the latter, the increased price to steel consumers has in many cases been much greater than the change in base prices would indicate.

Whatever gains steel firms may have made in the past few weeks because of price adjustments have already been affected by higher scrap prices appearing suddenly early this week. At some major centers the price of heavy melting steel has gone up as much as $4 or $5 a ton above last week's levels. Dislocation of scrap tonnages was cited in some circles as the principal reason why some consumers decided to step out with higher offers in an effort to quickly garner as much tonnage as possible. Since many scrap consumers had the same idea at the same time and since scrap supplies are not over plentiful an unusual rise in prices materialized.

As the result of this week's sharp scrap price increases, THE IRON AGE scrap composite price has moved up from last week's figure of $25 a gross ton to $28.17 a ton, an increase of $3.17 per gross ton. The action which took place in some districts early this week is expected to produce a similar situation in those areas where quotations remained more or less unchanged.

• **FLAT ROLLED SHIPMENTS UP**—Shipments of hot and cold rolled sheet and strip steel during October 1946 were at all-time high levels, according to the American Iron & Steel Institute. Reflecting the operation of some new facilities, October's shipments totaled 1,450,196 tons, topping any previous wartime or peacetime month. Allowing for the greater number of working days in October, production of these items during that period was at an annual rate of 16,956,000 tons. In 1941, when many records were set in the production of consumer durable goods, only 14,570,000 tons of sheet and strip steel were shipped by the industry.

• **NEW WHEEL PRICES**—Effective Dec. 15, Carnegie-Illinois Steel Corp. raised the price of all steel wheels as follows: (There will be no increase on one-wear freight wheels.) Untreated, 33 in. standard tender or engine truck wheels, up 15 pct. Untreated roller bearing wheels up 15 pct. All other standard steam and electric service wheels including subway, elevated, industrial, mine car and mine locomotive wheels are up 10 pct. If the wheel requires heat treatment, the price will be on a basis of $12 per ton which is added to the new prices of the untreated wheels. Crane track wheels are up 20 pct. In cases where the prices do not figure out to the even dollar, Carnegie will charge the nearest dollar price, if it is over 50¢, and will charge the lower dollar price if the break is under 50¢.

• **ARBITRARY PRICES**—The increases in the rail rates effective Jan. 1 and the anticipated increases in the ocean rates, will mean a complete overhauling of the arbitrary delivered prices of steel to the Gulf ports and to West Coast ports. The freight increases cannot be borne by the steel producers without an adjustment to take care of the freight alone in the arbitrary prices. On top of these adjustments will also be the adjustments brought about by the actual increases made in the prices of various steel commodities.

• **NEW RAIL PRICES**—Effective Dec. 13, Carnegie-Illinois Steel Co. raised the price of all rails and certain accessories which cover all sales made in this country. On standard rails over 60 lb the new price is $2.50 a cwt, for No. 1, $2.40 a cwt for No. 2, and $2.45 a cwt if the customer orders all No. 2 rails. Splice bars were moved up to $3 a cwt with tieplates set at $2.80. Light rails under 60 lb are now $2.85 a cwt with an extra of 10¢ a cwt for 50 lb rails and a 20¢ extra for rails 45 to 25 lb inclusive. A 25¢ fabricating quality extra is also now in effect. The above prices are f.o.b. the mills.

• **UMW CHALLENGES COURT**—Challenging the decision of Judge T. Alan Goldsborough which held the UMW and its head, John L. Lewis, in contempt of court for refusing to obey an injunction, the union and its chief have filed a petition with the Supreme Court which lists 10 points which will be raised when the case comes up for review.

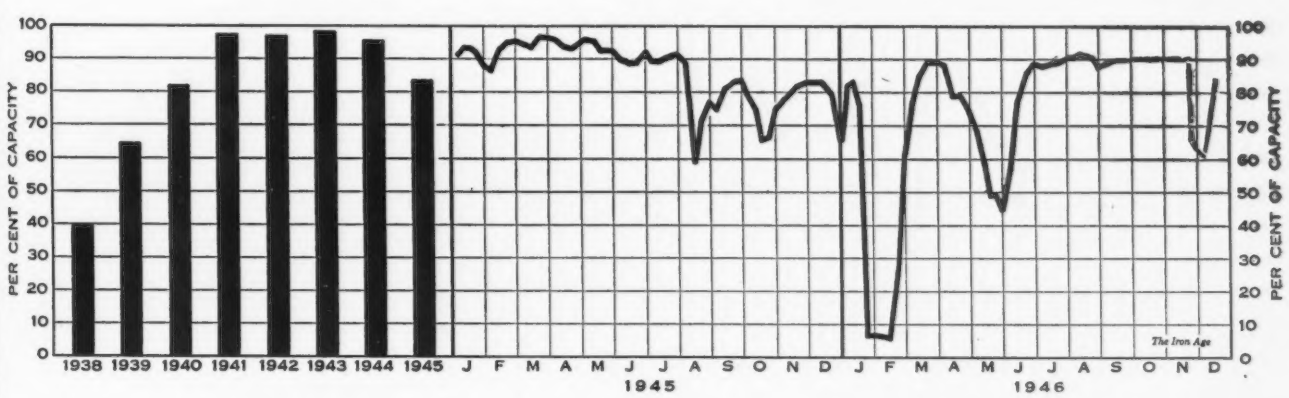
The case will be argued before the high court on Jan. 14. In its petition, the UMW asked the Supreme Court to broaden the considerations so as to include a ruling on such major aspects of the case as the applicability of the Norris-LaGuardia Act in issuing the injunction. Attorney General Tom C. Clark had previously asked that the Norris-LaGuardia and Clayton Acts not be considered at this time but that only a ruling made on the contempt appeal.

• **NEW POWER PLANT**—To be used in operating increased hot strip, cold sheet and cold tinplate mill capacity, CPA, now a part of the Office of Temporary Controls, has approved construction of a $1,802,338 power plant at Sparrows Point, Md., by the Bethlehem Steel Co. Total cost of the new Sparrows Point plant, including equipment, is estimated at $9,168,245. The application to build the power plant said that approximately 60,000 kw of additional current will be generated.

• **AUTO EXPORTS DOWN**—From the end of the war until June 1946, according to the Automotive Manufacturers Assn., only 36,596 passenger cars went to the export markets, or 5 pct of production. In 1937 more than 272,000 were shipped abroad, and in 1929 the number exceeded 451,000.

• **MYSTIC FURNACE NOW IN**—The Everett, Mass. furnace of the Mystic Iron Works went into action Dec. 12 following a shutdown of about 2 yr. Originally it was planned to blow in Nov. 15, but due to the maritime strike and the uncertainty of the coke supply, the government requested a postponement. The subsequent coal strike further postponed blowing in, following which the government's coal regulation agency suggested the furnace blow in Apr. 1. But due to the acute shortage of pig iron throughout New England with many foundries on the verge of closing, government permission was obtained to blow in Dec. 12. The furnace has failed to follow those in other sections of the country in advancing prices. Just what action Mystic will take in prices is "problematical," according to management.

Steel Ingot Production by Districts and Per Cent of Capacity

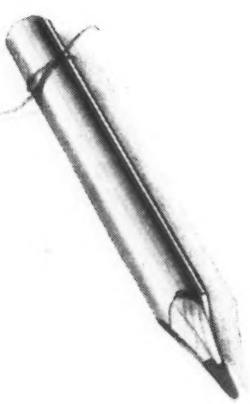


Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
December 10...	71.0*	77.5	44.0	60.0	87.0*	77.0*	80.5	60.0	104.5	75.0	91.4	66.0	75.0	70.5
December 17...	93.5	86.5	77.5	85.0	95.0	104.5	85.0	80.0	107.0	69.0	95.4	80.0	88.0	85.0

* Revised.

THE *NEW* ARITHMETIC IN STEEL

SUBTRACT— ¼ OF THE STEEL PER PRODUCT—
ADD— ⅓ MORE PRODUCTS PER TON



3 TONS OF N-A-X HIGH-TENSILE WILL DO THE WORK OF 4 TONS OF CARBON SHEET STEEL— WITH NO SACRIFICE IN PRODUCT STRENGTH

N-A-X HIGH-TENSILE is now making possible the production of more and better products per ton of steel in many plants.

It is a common experience to find that sections can be made as much as 25% lighter—with no loss of strength, and with an increase in durability. That is because N-A-X HIGH-TENSILE is so much stronger and tougher, so much more resistant to fatigue and corrosion, than ordinary carbon sheet steel. The difference between the two is so marked that three tons of N-A-X HIGH-TENSILE will ordinarily do the work of four tons of the other.

Yet with all its strength, N-A-X HIGH-TENSILE has excellent formability. It can be cold-formed and deep-drawn to produce intricate parts; and it has good weldability. These superior qualities bring you not only a better product—but also important economies in handling, fabricating and finishing.

The many advantages of N-A-X HIGH-TENSILE have created a demand that is in excess of the current supply. However, our engineers will be glad to discuss your specific problems with you against the day when this superior steel is available to all.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N-A-X
HIGH-TENSILE STEEL

GREAT LAKES STEEL
Corporation
N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

Steel Deliveries Now Being Governed by Quota System

Chicago

• • • **With the sale** and shipment of steel on a quota or distribution basis, the old practice of a bona-fied delivery promise or first open date, has gone by the board. The only exceptions are alloy, high strength and stainless of the larger volume items. Open dates still occasionally appear and the possibilities of securing quick delivery on excess prime and waste wasters remain substantial, but the bulk of all other tonnages are sewed up tight, with the mills for the most part having been giving orders against about 90 pct of the established quota. Two mills in the district having accepted orders against quotas for the 6 months of 1947 while one other large producer has restricted the orders only through the first quarter.

The clearing of old backlogs and the rescheduling on actual current requirements, which is now completed, has clarified a lot of confusion and simplified the bookkeeping but deliveries haven't improved. In many cases, the amount of the delivered tonnages will be worse than last year as some of the mills found it necessary to cut quota allocations on certain items to bring them more in line with reality. In the reshuffle of orders customers were given a chance to move critical items ahead in an effort to better balancing their inventories but this relief was restricted as too many consumers are short in the same items.

Most producers are on a sounder footing for making good their commitments for 1947 than they were at this same time last year. Barring long labor tie-ups or further raw material disturbances, the trade has a better chance of getting its allocated tonnages with fewer broken promises or deferred shipment during the next 6 months.

On the average, the results of the mills having committed themselves against the first 6 months quotas have run out the scheduled rolling on each item as follows: Hot and cold-rolled sheets including all coated sheets are solid through June. One producer reports that small bars, 2 in. and

D. I. BROWN
Chicago Regional Editor

o o o

under, are scheduled through May with larger bars only booked through March.

Another maker reports that small bars up to and including 3 in. are scheduled through June with the larger bars extended only to the end of the first quarter. Plate quotas have been ordered by the trade and scheduled for the most part through April, except plates 160 in. and over for which there is less demand. Structural shapes are booked solid through April by one producer, and through May by another.

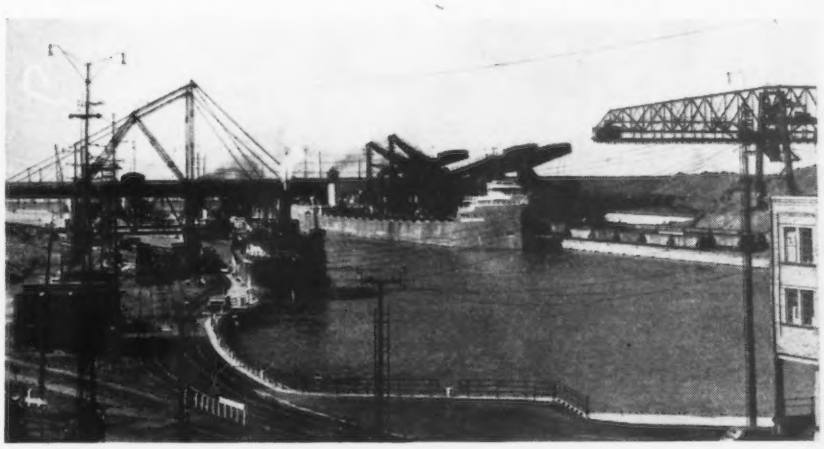
Accepted orders on high strength low alloy steel on the average are only out 5 to 8 weeks and delivery is not controlled by quotas. Regular alloys, which are also not covered by quotas, can be had with the delivery promise from all suppliers in either January or February, depending on size. The competition in selling this item is keen as the demand is not so great and these products are for the most part regarded as lucrative items. The only exception to the above is one mill whose books are open for only the first quarter and this company reports all items on quotas are booked solid for that time.

Rails, other than industrial, are a case by themselves. Large producers sell rails on the traditional contract basis which is sealed and signed for each year's requirements. A railroad announces its requirements to the mills and the mills sign up for what they consider the fair tonnage, and then, depending on sectional rollings, make deliveries for the next 12 months. The normal yearly yardstick governs the extent of the mills commitments and because of the present huge demand by so many roads, the whole practice is a very delicate tender subject involving much diplomacy and many headaches.

Consumers of steel products not able to get on the mills quota schedules are in a bad way. Warehouses take as good care of them as possible and during the past month warehouses have handled tremendous tonnages of steel. Steel brokers have become much more numerous and through these agents the out-in-the-cold consumer has been able to get steel, but the prices are stiff and the quality, size and gage, subject to many variations.

Unfortunately, the shortage of scrap has affected part of the new steel market. There have been

LAST ACT: *Busy scenes like this one at U. S. Steel's Pittsburgh & Conneaut Dock Co., Conneaut, Ohio, came to an end early this month as the* 1946 *iron ore shipping season at this Great Lakes port closed. Huge lake ore carriers like the* Benjamin F. Fairless, *shown above being unloaded, carried this year* 8½ *million tons of the rich red earth of Minnesota and Michigan into Conneaut's docks alone.*



many instances where in order to get steel complicated deals have been made with scrap one of the mediums of exchange. Larger mills, particularly those well integrated, have not had much of a part in this, but others through desperation have been forced to bargain. As long as scrap remains tight and demand for steel is high, observers here see no let-up of this practice or any general relief in sight.

Because of shortages many smaller producers of flat rolled have been bought up by interests needing sheets. This practice has made semifinished, such as sheet bar, the all important link in the delivery chain. Most mills have more finishing capacity than they can keep rolling with their available primary stock. The brokers who are able to control the semifinished have little trouble in getting somebody to roll it into flat products. Kaiser has shipped slabs into this area which were converted into heavy gage sheets, 40 in. and wider and he also has been after a local mill to roll narrow, light gage coil strip out of the semifinish he can furnish.

The hard pressed steel buyers have found that in a pinch they can get sheets but they don't like the prices. The reason sheets have found their way to such markets was because of the low prices the mills were held to under OPA. Some of the mills decided they couldn't possibly take the risk of asking the prices they needed directly from the buyer, but through a middleman the sheets could be sold with no reflection on them.

Major Extra Revisions Feature Flat Steel Price Changes

Philadelphia

• • • **The new base prices** for flat-rolled steel products announced recently by producers are deceptively low for estimating the net cost increase to steel consumers of readjusted base prices and extras. In some instances the base price has actually been lowered although because of a change in base gage or grade the readjustment represents an increase in base price.

In addition to appreciable increases in extras, there are a number of new extras which have been added for services formerly provided free of charge. Most steel producers have as yet issued only a partial list of applicable extra charges, but the trend is apparent from those already published.

New extras applicable to hot and cold-rolled sheets include a loading extra, a packaging extra, and a 25¢ extra for special stenciling. There is a new heat treatment extra on hot-rolled sheets which was formerly included under drawing quality extra.

There is no longer a mill run deduction on cold-rolled sheets. Now there is a surface inspection extra in addition to the former 25¢ extra for primes only, required when two good surfaces are required on cold-rolled sheets. Heavy extras on cold-rolled sheets have been discontinued as a single extra and are included in the new gage and width extras. Formerly there were no published extras on cold-rolled sheets up to 6 gage and heavier but these have now been included in the extra lists. Now there are three published qualities of cold-rolled sheets: Commercial quality, deep drawing quality, and luster quality.

Hot and cold-rolled sheet extras have been changed on order quantity, and on item quantity, extras have been changed and quantities have been changed. Length, gage and width extras have also been changed. The permissible variation in shipments has been modified as follows: On items of ten tons and over, shipments may be 5 pct over or under; on items of five to ten tons, shipments may be 10 pct over or under; on items under 5 tons, permissible shipments may be 25 pct over or 10 pct under.

Hot-rolled sheet gages now run from 0.203 in. to 0.0449 in.

Flat Hot-Rolled Carbon Steel

Thickness in Inches	Widths in Inches: To 3½	Over 3½ Up to 6	Over 6 Up to 12	Over 12
0.2031 or thicker	bar	bar	plate	plate
0.2030 to 0.0568	strip	strip	strip	sheet
0.0567 to 0.0447	strip	strip	sheet	sheet
0.0448 to 0.0344	strip	strip	hra	hra
0.0343 to 0.0255	strip	hra	hra	hra
0.0254 to 0.0142	hra	hra	hra	hra
0.0141 or thinner	hra	hra	hra	hra

hra—Hot rolled and annealed.

Flat Cold-Rolled Carbon Steel

Width in Inches	Thickness in Inches: 0.025 or Thicker	0.2499 to 0.0142	0.0141 or Thinner
Up to 12	bar	strip[1]	strip
Over 12 to 24	strip[2]	strip[2]	strip[2]
Over 12 to 24	sheet[3]	sheet[3]	tinmill[3]
Over 24 to 32	sheet	sheet	tinmill
Over 32	sheet	sheet	sheet

[1] Flat wire is up to ½-in. wide, in thickness less than 0.225 in., not to exceed 0.05 sq. in. in cross-section, having rolled or prepared edges.

[2] If special edge, finish or definite temper as defined in ASTM specification A-109.

[3] If no special edge, finish or temper is specified.

Removes Inventory Rules From 40 Items

Washington

• • • **Under the revision** of the inventory control regulation (PR 32), 40 products have been removed from all restrictions, restrictions have been modified on 18 items, and six materials have been added to table 1, imposing specific restrictions, according to the Office of Temporary Controls.

Included among the items removed from inventory control were aluminum (except sheet and extrusions), face brick, diamond dies, feldspar, fluorspar, graphite, jewel bearings all forms of magnesium, platinum, gold, silver and a number of other minerals.

Materials added to table 1 were aluminum sheet and extrusions and asbestos cement shingles and flat sheets, now limited to 45 days' supply, packing gaskets and oil seals and asbestos friction materials, 30 days. Aluminum sheet was formerly restricted to a practicable working inventory only.

Fabricated structural steel and structural sheet cut to length for assembly was added to the table, CPA said in making the announcement for the OTC, largely to call attention to the fact that such items were subject to the working inventory restrictions.

OTC to Liquidate Some War Emergency Agencies

Washington

• • • **Several wartime** emergency agencies recently entered upon their last phase with the creation through Executive Order of the Office of Temporary Controls. The OTC will be headed by Maj. Gen. Philip B. Fleming, Federal Works Administrator, who will direct both agencies.

Merged into the OTC are the remnants of the Office of Price Administration, Civilian Production Administration, Office of Economic Stabilization, and the Office of War Mobilization and Reconversion.

Under the same order, the National Wage Stabilization Board is terminated as of Feb. 24, 1947. Provisions of section 5(a) of the Act, as amended, will be transferred to the Treasury while any future functions of the War Labor Disputes Act are to be carried out by a special board or boards named by the Secretary of Labor when necessary.

The tripartite Steel Commission, created by the NWLB on Mar. 30, 1945 will continue to act within the Dept. of Labor until the Secretary of Labor may terminate it.

Work of the OTC will consist mainly of an orderly liquidation of the emergency agencies.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period OCTOBER - 1946

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	41	1	xxxx	xxxx	xxx	386,714	164,042	xxxx	xxx	2,988,107	1,362,466
Structural shapes (heavy)	12	2	9,421,550	395,466	53.4	387,302	xxxx	2,815,834	38.1	2,814,648	xxxx
Steel piling	4	3		32,180		31,190	xxxx	176,807		158,540	xxxx
Plates (sheared and universal)	29	4	17,080,770	472,276	32.5	486,456	19,105	3,528,614	24.8	3,520,477	216,569
Skelp	6	5	xxxx	xxxx	xxx	56,711	24,165	xxxx	xxx	350,432	159,970
Rails—Standard (over 60 lbs.)	4	6	3,657,000	215,225	69.3	213,671	xxxx	1,473,361	48.4	1,435,893	xxxx
—All other	5	7	392,000	10,084	30.3	12,613	xxxx	117,125	35.9	120,353	xxxx
Splice bars and tie plates	13	8	1,745,960	60,488	40.8	59,332	xxxx	508,706	35.0	531,531	xxxx
Track spikes	11	9	349,400	16,015	53.9	15,560	xxxx	114,602	39.4	119,186	xxxx
Hot Rolled Bars—Carbon	34	10	xxxx	756,966	xxx	629,768	80,407	5,658,036	xxx	* 4,624,196	583,790
—Reinforcing—New billet	15	11	xxxx	93,044	xxx	115,531	xxxx	777,261	xxx	858,603	xxxx
—Rerolled	12	12	xxxx	13,240	xxx	12,902	xxxx	114,356	xxx	115,717	xxxx
—Alloy	24	13	xxxx	207,459	xxx	175,568	11,469	1,445,076	xxx	* 1,212,858	104,263
—Total	41	14	22,326,160	1,070,709	56.4	933,769	91,876	7,994,729	43.0	6,811,374	688,053
Cold Finished Bars—Carbon	24	15	xxxx	141,771	xxx	139,129	xxxx	1,070,035	xxx	1,062,070	xxxx
—Alloy	23	16	xxxx	21,351	xxx	19,227	xxxx	181,206	xxx	161,804	xxxx
—Total	31	17	2,851,510	163,122	67.3	158,356	xxxx	1,251,241	52.7	1,223,874	xxxx
Tool steel bars	19	18	262,810	8,786	39.3	8,133	xxxx	83,758	38.3	80,379	xxxx
Pipe & Tubes—Butt weld	14	19	2,215,520	149,270	79.3	130,675	xxxx	1,151,367	62.4	1,073,781	xxxx
—Lap weld	9	20	730,200	32,656	52.6	31,712	xxxx	231,342	38.0	246,525	xxxx
—Electric weld	10	21	1,536,900	88,599	67.9	76,530	xxxx	641,430	50.1	551,020	xxxx
—Seamless	13	22	3,169,600	232,414	86.3	201,595	xxxx	1,801,955	68.3	1,582,294	xxxx
—Conduit (cap. & prod. incl. above)	6	23	xxxx	xxxx	xxx	12,501	xxxx	xxxx	xxx	80,287	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	44,724	xxxx	xxxx	xxx	356,373	xxxx
Wire rods	26	25	7,293,670	476,441	76.9	107,340	37,796	3,617,598	59.5	852,767	293,577
Wire—Drawn	41	26	5,742,890	377,302	77.3	215,381	11,199	2,863,057	59.9	1,650,589	112,610
—Nails and staples	19	27	1,259,760	68,907	64.4	68,360	xxxx	492,191	46.9	492,239	xxxx
—Barbed and twisted	16	28	543,010	20,389	44.2	19,314	xxxx	172,660	38.2	170,293	xxxx
—Woven wire fence	16	29	1,121,060	36,735	38.6	36,994	xxxx	313,932	33.6	315,242	xxxx
—Bale ties	13	30	149,700	11,031	86.7	11,530	xxxx	76,747	61.5	80,501	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	77,848	49	xxxx	xxx	608,813	1,326
—Chemically treated	8	32	465,000	12,761	32.3	10,276	xxxx	105,267	27.2	101,692	xxxx
Tin and Terne Plate—Hot dipped	9	33	3,758,850	183,462	57.4	174,743	xxxx	1,506,736	48.1	1,588,118	xxxx
—Electrolytic	9	34	2,231,850	82,344	43.4	78,053	xxxx	728,626	39.2	733,093	xxxx
Sheets—Hot rolled	31	35	19,785,320	1,476,281	87.8	700,107	45,790	11,261,983	68.3	5,087,816	342,512
—Cold rolled	14	36	7,309,460	575,123	92.6	438,520	xxxx	4,482,844	73.6	3,259,276	xxxx
—Galvanized	16	37	2,924,130	139,234	56.0	140,236	xxxx	1,159,311	47.6	1,194,487	xxxx
Strip—Hot rolled	25	38	7,180,030	270,886	44.4	178,237	20,485	2,012,838	33.7	1,282,969	197,260
—Cold rolled	34	39	3,067,450	139,173	53.4	133,332	xxxx	1,088,411	42.6	1,053,433	xxxx
Wheels (car, rolled steel)	5	40	315,400	24,006	89.6	22,847	xxxx	197,794	75.3	201,646	xxxx
Axles	6	41	398,170	15,484	45.8	13,831	xxxx	108,092	32.6	102,760	xxxx
All other	3	42	169,510	4,669	32.4	846	xxxx	36,582	25.9	5,079	xxxx
TOTAL STEEL PRODUCTS	143	43	xxxx	xxxx	xxx	5,675,339	414,507	xxxx	xxx	42,825,887	3,374,343
Effective steel finishing capacity	143	44	64,648,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	143	45	xxxx	xxxx	xxx	95.8%	xxxx	xxxx	xxx	73.7 %	xxxx

* Adjusted.

Major U. S. Strikes Hold Back Industrial Expansion in Brazil

BY TOM CAMPBELL
News-Markets Editor

São Paulo, Brazil

• • • **The steel and coal** strikes as well as other shutdowns in manufacturing plants in the United States during 1946 have had a far reaching effect on Brazilian industry. A substantial number of orders for modern equipment were placed in the states sometime ago and manufacturers here and in Rio de Janeiro are not yet sure just when this material will be received.

In almost every industrial plant throughout this area inquiries about conditions in the United States are manifold. The question most commonly asked by Brazilians of American industrialists or journalists is, "When can we get new equipment?" The recent coal strike, it is understood here, will further accentuate the delivery problem to Brazilian industry from the United States for some months to come.

Demand for steel, especially flat-rolled and tinplate is exceedingly heavy here and it is far greater than the supply currently reaching this industrial city and other manufacturing towns. Some industrialists in this area have made repeated requests for steel or even information as to availability to various American steel companies. Most of these requests were not fulfilled and in many cases letters have gone unanswered.

The strong demand for U. S. equipment and steel products does not necessarily stem from what North Americans term reconversion demand. The activity here which is being continually delayed by shortages is part and parcel of an industrial development which is hardly more than 10 yr old. Production figures of at least one major industrial concern in this area over the past few years are phenomenal.

The Laminacao Nacional de Metais S/A with plants at Utinga near here is one of the largest and among the most important plants in South America for the manufacture of plates, sheets, strip, circles, tubings, rods, extruded shapes and wire of nonferrous metals, and its production records since 1941 are typical of the progress made by Brazilian industry during the last few years.

In 1941 this company produced 3364 tons of its products, while it is estimated that production for the year 1946 will approximate 9000 tons—an increase of almost 200 pct since 1941. Total sales of the company in 1941 were about $3 million but for the year 1946 sales volume in U. S. money will amount to more than $9 million. While these figures may appear small to some U. S. manufacturers, comparisons with activity in the United States are not only unfair but meaningless.

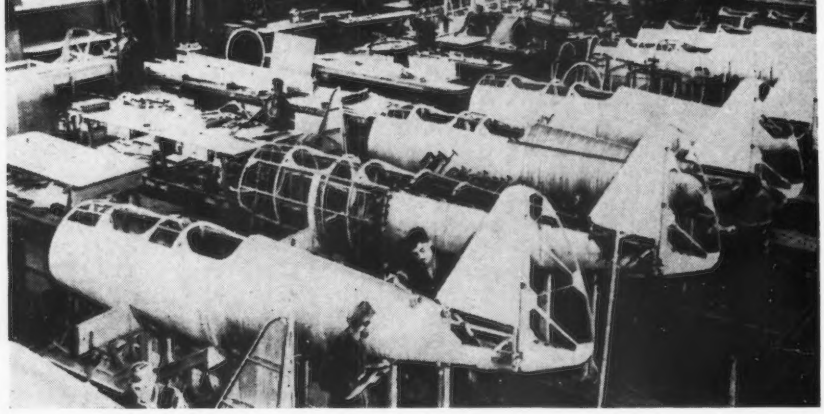
Brazilian industry, which expects to go forward at an accelerated rate over the next few years, can only be gaged when current activity here today is compared with production of 10 yr ago. High Brazilian officials have pointed out that the relationship between the United States and their country from an industrial standpoint is exceedingly good because of the close cooperation extended by engineers and executives to industry here by some American companies.

An example of this cooperation was disclosed during a visit to the Lagoa Santa aircraft factory owned by the Francisco Pignatari organization where North American AT-6 training planes are manufactured for the Brazilian air corps. When this plant was first designed, the Cincinnati Milling Machine Co. contacted the Pignatari organization and layed before it a layout plan for machines as well as a comprehensive training program to train new employees for machine tool work.

This American company placed a Brazilian engineer on the job who took complete charge of the installation and carried through a program which resulted in a well-trained working force. A byproduct of this experience, it was said, resulted when the Cincinnati company contacted young Brazilian engineers, brought them to the United States for training and returned them to Brazil as sales specialists.

An interview with many industrialists brought forth the information that sales representatives and engineers from countries other than the United States appear to be on many occasions better equipped to "get the orders." In some instances U. S. concerns have failed to send the proper technicians to

ONE A DAY: *On this assembly line of Companhia Aeronautica Pualista at Utinga near Sao Paulo, Brazil, are produced about 30 light planes a month. The company, a subsidiary of the Pignatari organization, employs about 400 workers and has been manufacturing light planes for about 3 yr.*



Brazil with full authority to make firm commitments with regard to material, shipments and prices.

It was apparent, however, that many U. S. concerns have made substantial progress in surplanting British and continental concerns in Brazilian business transactions. While high Brazilian officials and industrialists were extremely reluctant to find any fault with or make criticism of some U. S. business practices here, a serious attempt to find out what some of the drawbacks were pointed to the credit situation.

One high governmental official who owns a large manufacturing plant of his own believed it to be unfair for many U. S. firms to require Brazilian interests to have "cash on the barrelhead" before commitments for machinery and other materials are made. This industrialist, who along with Francisco Pignatari and other leading Brazilian businessmen, is attempting to give his country the benefits of technological advancement made in the states, reluctantly disclosed that he knew of only one major steel producer in the United States who extended the usual business credit arrangements when selling here. This company, he said, was Weirton Steel Co.

There appeared to be the opinion in some quarters here that too little attention was paid to the fact that Brazilian industry of today is far different than what it was many years ago and thus should be treated as a grown-up person rather than as a child.

The writer found ample evidence that Brazilian industrialists are well aware of various capacities for production in the United States and they, like many in the United States, recognize the fact that although demand is now outrunning supply this will not always be the case. The substantial prices which Brazilians have had to pay for imported machinery and materials because of higher export prices as well as resellers commissions have produced their effect on this country's economy in the larger cities, such as São Paulo.

Wages have advanced substantially when compared with wage rates here of only a few years ago. Living costs on the other hand have also climbed rapidly and for some of the luxury items and industrial products, prices paid are almost the same as in the United States. Whatever happens in the latter country has almost immediate repercussions here.

FLYING PRESIDENT: *Francisco Pignatari (right), head of a large nonferrous enterprise in Brazil, receives the "Diploma D'Honneur" of the Ligue Internationale des Aviateurs from U. S. Sen. Edwin C. Johnson, while Col. Charles W. Kerwood (left), president of the American section of the league, looks on. Other recipients of the award include: Admiral Byrd, Orville Wright, Captain Rickenbacker, General Doolittle, Charles Lindbergh, and Glenn Curtiss. The award is given for signal contributions to aeronautics.*

For the past few years Brazilian industry has been making a concerted effort to expand and produce new markets for Brazil in Brazil. An example of this situation was disclosed at the Rochedo plant of the Companhia Brasileira de Artefactos de Metais where aluminium cooking utensils and other aluminium ware is being produced. In 1940 this company's sales amounted to $176,950, whereas sales in 1946 are expected to be in excess of $1,600,000.

In 1940 this plant was producing from 10 to 20 tons of finished aluminum products a month. In 1946 the production is currently at 100 tons a month. According to plant officials there the demand for such products in the market here approximate 400 tons per month.

While the Pignatari organization has developed its own aluminium plant having its own bauxide ore mines, for the time being practically all finished aluminum products are processed from aluminum pig purchased from Aluminum Co. of America. The Brazilian company makes its own ingots from these pigs and also produces the various shapes necessary for the production of finished aluminium goods such as cooking utensils and kitchenware.

Taking a cue from the production experience of lighter plane manufacturers in the United States the Pignatari organization formed sometime ago an airplane company called Companhia Aeronautica Paulista, located at Utinga. Approximately 400 workers are engaged in producing light planes, the demand for which is growing substantially here where transportation by air is the most favored method of travel.

During the year of 1945-46 200 planes known as the CAP-4 were delivered. A second type of plane manufactured by the company is known as the CAP-1. The engines for these planes are imported from the United States. At the present time about 30 planes a month are being produced. Officials from similar companies in the United States have visited this airplane factory and in some cases have been able to learn some new methods of preparing tubular material for the plane's fuselage.

A perusal of statistics on

Brazilian industrial activity tells no more about general conditions than one could find in leaping through business statistics of the United States. A desire to follow in the footsteps of United States industrialization is strong everywhere in Brazilian industrial centers. The activities and the progress of the Pignatari organization which had its modest beginning in 1933 when Dr. Julio Pignatari founded a small industry for aluminum foil rolling is exhibited by all industrialists both large and small in this and other manufacturing centers.

AN OLD STORY: *This modern aircraft factory built just before the war with private capital turns out North American AT-6 training planes for the Brazilian air force. The Pignatari organization is negotiating to obtain a greater volume of government business at this war-born plant because higher prices and inflation have made the original governmental commitment inadequate for utilization of the plant facilities.*

Already the number of wage earners in Brazil has climbed beyond 2 million and some sources believe that the figure is closer to 2.5 million. This is in contrast to 1942 when wage earners in industry numbered about 1.5 million. Judging from current production statistics businessmen here will be quite busy reaching and extending their own markets before any time can be given to the question of exporting equipment and metalworking goods.

This country has adequate skill, engineers and raw materials to duplicate an industrial expansion similar to that which occurred in the United States many years ago. Much of the equipment now being used here and in other factory centers has been designed and produced by Brazilian engineers and manufacturers. Furthermore, the number of businessmen who are leaving here to spend an extended time in the United States to study American methods is continually increasing.

The establishment of the Volta Redonda Steel plant in Brazil by no means spells the end of steel imports. Industrialists here say that sooner or later the high investment cost of this plant must be written down in order to obtain reasonable steelmaking costs. Nevertheless this plant will add greatly to the material needed in coming years when the number of industrial plants is expected to expand substantially.

There seems little doubt that over the next several years agreements between U. S. companies and Brazil are bound to be made with respect to the exportation of high-grade iron ore to the United States. Estimated reserves of this high-grade ore have been set at 15 billion tons or 22 pct of the known world reserves. According to "Brasil" published in 1941 by the Secretary of Foreign Affairs, iron ore reserves with an iron content of 65 pct amount to 1.5 billion tons. Ore with an iron content ranging from 50 to 60 pct is said to amount to 3.5 billion tons, while ore with a content of 30 to 50 pct iron is estimated at 10 billion tons. This ore is located in Minas Geraes at a distance of 350 miles from the coast.

Aside from the fact that the government may be holding on tight to its iron ore reserves, railroad and mining facilities are said to be one factor responsible for the small exportations of iron ore. Exports of iron ore from 1936 to 1940 were as follows: 1936, 110,997 tons; 1937, 185,640 tons; 1938, 368,510 tons; 1939, 396,938 tons; and 1940, 255,548 tons.

Another important company here is the Companhia Brasileira do Zinco which manufactures electrolytic zinc, sulfuric acid, copper and zinc sulfate. The plant employs 103 wage earners and in 1943 its sales in U. S. dollars amounted to $48,000. Indications are that 1946 sales will come close to $240,000, a drop from 1944 when sales totaled $352,000. This is the only plant which produces electrolytic zinc in Brazil. Zinc produced there is consumed entirely by the parent company, Laminacao Nacional de Metais. The layout for the construction of the sulfuric acid plant was made by Andrew M. Fairlie, Atlanta, Ga., U.S.A.

One of the major difficulties which industry here faces is the attempt to force employees to work in a safe manner. Adequate laws have been passed by the country to safeguard the health and life of the worker, but in many instances he shows little regard for either. Part of this is due to the speed with which industry has expanded over the past few years. Concentrated safety instruction is constantly being given and accident rates have been reduced, but the failure of many workers to cooperate with the management is one obstacle which must be overcome if accident prevention is to become highly successful.

Another factor faced by Brazilian industries is the high rate of absenteeism which in many cases runs as high as 25 to 30 pct. In some of the more modern plants, however, absenteeism has been cut to as low as 12 or 13 pct.

For U. S. concerns which are interested in doing a continuous business with firms in this country, it is apparent that members of such firms should spend considerable time in Brazil making the proper contacts and learning something of the problems which industry is encountering there.

Weekly Gallup Polls . . .

Many Believe Prices Will Drop in Next Six Months

Princeton, N. J.

• • • **A sharp change** has taken place recently in public thinking about what is going to happen to prices in the near future, according to George Gallup, director, American Institute of Public Opinion.

It is a change which could very well produce some interesting repercussions within the U. S. economy.

A little more than 3 months ago, nine out of ten people felt prices were due to continue their climb. They said prices would be higher in the future than they were at that time.

At present, a substantial segment of the voting population apparently feels we are over the hump in the matter of prices; they say they think prices will be dropping in the months ahead.

In measuring public thinking at present on the matter of prices, the institute had field reporters put the following question to cross-section of the voting population:

"Do you think prices in general will be higher, lower, or about the same 6 months from now?"

	Pct
Think prices will be higher	31
Think prices will be lower	38
Think prices will stay about same	26
Undecided	5

This change in thinking may have an important bearing upon consumer buying in the period directly ahead.

If people think prices will be lower 6 months from now they will be given reason for postponing the purchase of all but necessities—awaiting a price drop.

Such action, by producing an abundance of goods might very well produce the anticipated drop. However, such a situation is not likely to develop in the immediate future, since there are still many millions who believe prices are going to continue to go up, not down.

Their purchases would act as a cushion to any widespread price collapse. The situation would become serious for manufacturers and producers if 80 or 90 pct. believed prices were going to be dropping soon, instead of the 38 pct at present.

Differences in thinking on the question are shown among principal population groups:

	Higher Pct	Lower Pct	Same Pct	No Opin. Pct
Men	32	40	24	4
Women	30	35	27	8
College	36	39	21	4
High school	31	40	26	3
Elementary school or less	30	37	26	7
White collar	32	42	22	4
Farmers	27	38	30	5
Prof. & bus.	33	41	22	4
Manual workers	31	35	27	7

▪

• • • **The administration's firmness** in dealing with John L. Lewis may recoup some of President Truman's political losses.

Although the President's popularity, as measured by institute polls, had fallen to a low point just before the November elections, Mr. Truman remains today the top choice for 1948 among Democratic voters expressing an opinion.

Whether he will run in 1948 is something which he alone knows. But it seems clear from the recent poll that those Democratic voters who have given thought to the matter of the 1948 nomination prefer him to anyone else. However, his lead over other men mentioned is not as great as it was in a similar poll last August.

Henry A. Wallace, former Secretary of Agriculture, ranks second in popularity among Democrats, with Secretary of State James F. Byrnes third. More than half (53 pct) of the Democratic voters polled said they were not ready to express a preference at this time.

The vote of those with an opinion follows:

"If you had to decide today, who would be your choice for President in 1948?"

Democratic Voters Only

	Pct
Truman	48
Wallace	24
Byrnes	10
Eisenhower	8
Byrd	1
Pepper	1
Vinson	1
Douglas	1
Barkley	1
Farley	1
Eleanor Roosevelt	1
Others	3

Truman and Dewey Continue As Top Choice of Voters for 1948; Interest Lacking in Third Party

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In a similar poll in August President Truman received 62 pct, Wallace 19, Gen. Dwight D. Eisenhower 5, Secretary Byrnes 4, and others a scattered vote totaling 10 pct.

The vote for General Eisenhower is of special interest. He is the only prominent public leader today who is frequently mentioned in both the Republican and Democratic camps as a possible 1948 presidential candidate.

His name has turned up regularly in every institute poll among Republican voters, and just as regularly in every poll of Democrats.

The latest poll on Republican possibilities for 1948 was completed in late November and reported last week. It showed Gov. Thomas E. Dewey of New York leading in popularity, with Harold E. Stassen next. The results are summarized below.

Choices of GOP Voters

	Pct
Dewey	52
Stassen	17
Vandenberg	9
Bricker	8
Warren	5
Taft	2
Eisenhower	2
MacArthur	2
Saltonstall	1
Others	2

About one fourth (23 pct) said they were undecided about their choice of candidate.

• • • **Will a new third party** be formed by organized labor and leaders sympathetic to it?

Ever since the swing to the right politically, as manifested in the Nov. 5 election, there has been a certain amount of talk about the

(CONTINUED ON PAGE 144)

CIO'S "PROOF": *Robert R. Nathan, right, former Government economist, whose report laid the foundation for the CIO drive for "substantial" wage increases, says U. S. manufacturers can afford a 21-pct wage boost without affecting prices. Secretary of the Interior J. A. Krug, left, and CIO president Murray, center appear to be listening.*

INDUSTRY

Nathan's Study Claims 21 Pct Wage Boost Possible

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By KARL RANNELLS
Washington Bureau

o o o

Washington

• • • **A drive to obtain** a general round of wage increases in mass production industries without price increases was opened here last week by Philip Murray, CIO chieftain and USWA head, in releasing a wage-profit study prepared for his organization by Robert R. Nathan, former deputy director of the Office of War Mobilization and Reconversion.

Business as a whole could stand a 25 pct wage increase and manufacturing industries as a group, 21 pct without boosting prices or trimming profits below the 6.9 pct return on net worth which prevailed in prewar years, the report declared.

For the manufacturing industries, the report added, this would amount to a total of $5.1 billion in wage increases out of an expected $15 billion in profits for 1946. Total corporate profits for the current year were estimated at around $25 billion. The study's percentages of wage increases apply to total wages on an industrywide basis and not to individual fields or firms, it was emphasized. The report, however, will be used as a yardstick in the coming negotiations by the steel and automobile unions, Mr. Murray said, although both the USWA and UAW are having separate studies made in reference to their particular industries. The steelworkers are meeting this week to map their strategy.

According to the study, hourly wages would have to be raised 10 pct and weekly wages by about 23 pct in order to bring the workers' purchasing power back to the January 1945 level. An increase of 17 pct is needed, it added, to meet the increased cost of living alone since announcement of the government wage policy in February 1946.

Simultaneously with the release of the Nathan report, the Automobile Manufacturers Assn. issued a statement declaring that the Nathan findings were based upon a fallacy. Experiences over the past year, the AMA said, have clearly shown that further increases in wages would result in higher costs, higher prices, fewer customers and unemployment in the industry.

Also, the report drew immediate fire from the Machinery & Allied Products Institute. George Terborgh, head of the institute's research department, declared that the 1936-39 standard used by Mr. Nathan was both inadequate and misleading. MAPI's spokesman declared that a profit of $15 billion, if such should prove true, would not be "inordinate" because the net worth carried on the industry books represents the prewar valuation only.

"Corporate profits after taxes," argued Mr. Nathan, "are now about one and three-fourths the volume of 1929 and three and three-fourths as high as the average of the years 1936-39. They are 45 pct above the best war years. It is obvious that the 1946 wage increases could have been absorbed without raising the general level of prices."

However, he declared, prices were increased. The net result was that the buying power of workers in the manufacturing industries is now only about 80 pct of what it was in January 1945. It was calculated that even a general overall increase of 21 pct would bring wages up to only what they should have been in October 1946. Mr. Nathan estimated that the cost of living would be increased by another 2 pct by January 1947.

Average weekly earnings of production workers, he asserted, have declined over the past 2 yr not only in buying power, but in actual dollars and cents. In general, he went on, only workers in the lower paid manufacturing fields have had their earnings increased.

"In durable manufactures, where the decline has been concentrated, there has been a net loss of $4.48 in weekly earnings," it was stated. "In nondurables, there was a rise of $3.82. But for all manufacturing there has been an average decline of $1.67 or 3.5 pct in weekly earnings from January 1945 to October 1946."

The average weekly wage of the steel worker was figured to have declined by $4.76 to $50.28 since January 1945 and that of the automotive worker by $6.30 to $53.12.

While the amounts of wage increases to be asked for in the steel industry are still unannounced, some hint may be derived from the Nathan discussion of the percentage rise in dollar earnings required to bring the real weekly earnings back to the January 1945 level as stated in the report, as well as the UAW demand equivalent to 30¢ an hr. In this connection, Mr. Nathan declared:

"For steel it was 25.7 pct, for automobiles it was 28.4 pct, and

for electrical machinery, 17.6 pct. There is no presumption that the profit position of companies in these industries varies in relation to the increases which would have been needed to restore the buying power of weekly earnings."

A corresponding increase in steel wages would average about 29¢ an hr.

In taking sharp issue with the Nathan findings, the AMA declared that wages in the automobile industry could not be increased further without boosting costs and, of course, prices. This reiterated the position recently taken by Charles E. Wilson, president of General Motors. General profits forecasts such as contained in the Nathan report, AMA said, served no good purpose but instead tended to hinder collective bargaining and promote industrial strife.

It further declared: "Despite the optimistic profits forecasts of a year ago, the companies manufacturing automobiles, as a group, suffered an operating loss of $135 million for the first 9 months of 1946 and a net loss of $5.5 million after tax refunds. And next year, there will be no tax refunds to offset operating losses."

However, the CIO report insisted that on a before taxes basis corporate income had nearly tripled, rising 290 pct since 1939 while wages had increased only 169 pct; on an after taxes basis, it said, corporate profits were still 183 pct, compared to 150 pct for wages, allowing ample leeway for an increase in wages without price boosts.

It was also held, breaking down the Nathan analysis still further, that the average hourly cost of work in manufacturing rose only 8.6¢ or 8.2 pct from January 1945 to date as compared with "an increase of 25.3 pct in all wholesale prices," for the same period. In addition, productivity or quality of work had "offset a substantial part of the increase in costs."

It was admitted that there is no way for the unions to compel a reduction in the rate of profit. The report advised the CIO to request industries to take profits into consideration during the coming wage negotiations.

This was attempted by the UAW the last time it negotiated with General Motors. Walter Reuther, UAW head, made a demand that the company books be brought in for inspection but the move failed. Mr. Nathan suggested that should the corporations refuse to open their books this year, published financial statements might be substituted as the basis for wage talks.

Recommendations are also made in the report as to minimum wages, taxes, social security, etc. In general, it declared that:

Tax policies should be altered considerably in order to discourage high prices and excessive profits; that taxes on low incomes should be reduced in greater proportion than on large incomes;

Minimum wages should be guaranteed at considerably higher levels than at present and that maintenance of full employment should be a public responsibility:

Social security and its benefits should be expanded in order to maintain greatest possible demand for commodities at times when need is greatest.

"The facts lead to the conclusion that not only from the point of view of the workers but for the benefit of the whole economy a further substantial wage increase without a general price increase is possible, justifiable and honorable," the report concluded.

Just Like That

Washington

• • • **"It would appear statesmanlike for both labor and management to look facts in the face and to arrive at peaceful conclusions with respect to sizeable wage increases immediately."**

—A National Wage Policy for 1947 by Robert R. Nathan

USWA Expected to Keep Specific Wage Demands Under Cover at Present

Pittsburgh

• • • **According to informed** circles here no specific cents per hour wage demand statement is expected to result from the series of union meetings which were taking place here this week, when the policy committee met with international officers to determine strategy policy for the forthcoming steel wage negotiations.

This action will be in direct contrast to that of a year ago, when a flat 25c an hour demand was presented to the steel industry. There is the possibility that the steel union will not show its hand until negotiations actually start between union and steel company officials. Even at that time the union may ask management to make an offer.

Labor observers here see the steel union as entering a better semblance of a collective bargaining conference than at any time in the past 5 yr. One thing appears certain, according to reliable sources here—Philip Murray will settle for nothing less than a substantial boost in the current wage rates. Any offer such as that made several years ago by the U. S. Steel Corp. when a figure of less than 5c an hour was presented, will be quickly rejected, it was indicated.

The second phase of union demands is expected to encompass a general social security program. The latter is expected to include a demand for a health-and-welfare fund, a guaranteed annual wage proposal and an expansion in pension benefits.

Contrary to some opinion, the union is not expected to spend much time on the question of portal-to-portal pay for the reason that most sources expect this problem will be settled as soon as Congress reconvenes. Some sources here look for Congress to legislate out of the picture any retroactivity for court cases brought against companies by the union alleging money due employees for "walking time."

While the probability of a nationwide steel strike has not been ruled out, chances that a tieup will not materialize are much better than they were a year ago. However, should steel company wage increase offers fall far short of union demands and should a stalemate result, there is every reason to believe a strike vote will be taken and a definite date set for a walkout, according to opinion here.

Inland Head Claims Coal Miner Picture Is Greatly Distorted

Chicago

• • • **Wilfred Sykes, president,** Inland Steel Co., at a press interview, here recently said, "The coal miner of today is the highest paid man in mass industry, his dollar will buy more than it will for most people and he actually works shorter hours than workers in other mass industries." Claiming that the public has a distorted picture of the coal miner's life which has been painted as an underpaid overworked sort of economic slavery, Mr. Sykes reviewed the status of the coal miner today and termed him the "aristocrat of industrial workers."

Pointing out that the coal miner takes home each week a paycheck larger than a worker in any comparable industry, he showed how the miner can buy more for his dollar than can other industrial workers. In the first place, Mr. Sykes said, "He lives in small towns and cities where living is much cheaper. His rent which is a big budget item costs him far less than is true almost anywhere else. His food costs are certainly comparable as he is paid in cash money and he can spend it anywhere he wishes."

Another highly important question that Mr. Sykes elaborated on was that of the conditions under which the miners work. The Inland official stated that a miner works 35 to 42 hr at a maximum. He elaborated with, "During the rest of the time for which he is paid, he is taking a ride or eating his lunch. The coal miner has contracted to work 5 days a week and he may work the sixth if he wants to. Each day he works overtime he gets paid for 9 hr at the highest pay rates in mass industry, but he is at his place of work only 7 hr. His general working conditions are good and he considers them to be good. The average mine today is of constant temperature and is thoroughly air conditioned with fresh air." At the same conference E. R. Price, general superintendent of coal properties, Inland Steel Co., Wheelright, Ky., went into further details substantiating the statements of Mr. Sykes.

Lifts 40 Items From Export License Control

Washington

• • • **The Office of** International Trade, Dept. of Commerce, has announced the removal of 40 additional items from the list of commodities subject to export licensing control. Among the items released from control are: Metal shutters; coal stokers and parts; and certain hardware items; electric underground mining locomotives; telephone instruments; hand generators and parts; magnetos and parts; ringers and parts.

Also included are: Batteries and boxes; telephone instrument parts; fluorescent electric interior lighting fixtures and parts; nonfluorescent portable lamps; electric extension lighting fixtures and parts; mine dredging machinery; underground mine belt conveyors; mine chain and elevator conveyors, shaker conveyors; duck bills, and truck loaders; electric underground mine drills.

Usable Steel Group Asks 50-Pct Allotment To Steel Warehouses

Washington

• • • **Recommendations have** been made by the Surplus Usable Steel Industry Advisory Committee that WAA procedures for disposal of surplus metals be shortened so that material may be made available more rapidly and that CPA allocate 50 pct "across the board" of such metals to steel warehouses. This action, taken at a WAA meeting on Dec. 10, it was stated, was due to the fact that the flow of steel mill products to small manufacturers is far below requirements.

W. H. Kelley, Chief of the Metal Sales Division of WAA, who conducted the meeting, said that he anticipated that 75 pct of the present inventories of government-owned surplus steel and nonferrous products, would become available within the next 60 days.

Members of the Surplus Usable Steel Industry Advisory Committee attending are: Sol Fox, National Sheet Steel Co., Chicago; Abraham M. Heinowitz, Eastern Metals Corp., New York; William Fabrikant, Dulian Steel Products, Inc., New York; J. Frederick Rogers, Beals McCarthy & Rogers, Inc., Buffalo; Arthur Cohen, Metal Purchasing Co., New York and H. B. Hoffman, Wilkoff Co., Youngstown, Ohio.

Made Metallurgical Head

Washington

• • • **Stephen M. Shelton,** metallurgical technologist, has been appointed as chief of the Albany, Ore., Division of the Bureau of Mines Metallurgical Branch. He succeeds Bruce A. Rogers. Best known for developing a process for making electrolytic manganese, Mr. Shelton will be in charge of research in zirconium, carbothermic magnesium, iron-phosphate ores, iron-nickel ores, electrolytic zinc, and non-metallic minerals at the Bureau's new experiment station at Albany. Prior to his present assignment, Mr. Shelton was with the Bureau's Foreign Minerals Division, and worked closely with the State Dept. as technical supervisor of all projects conducted in Latin America.

Coming Events

Dec. 26-31 International Science Exhibition, Boston.

Jan. 6-8 Institute of Scrap Iron & Steel, Inc., convention and exhibition, New York.

Jan. 27-31 Electrical Engineering Exposition, New York.

Jan. 27-31 International Heating and Ventilating Exposition, Cleveland.

Jan. 28-Feb. 2 Society of Plastics Engineers, exhibition, Chicago.

Mar. 17 American Institute of Mining & Metallurgical Engineers, world conference on mineral resources, New York.

Mar. 17-19 American Society of Lubrication Engineers, annual meeting, Pittsburgh.

Mar. 22 Western Metal Conference and Exposition, American Society for Metals, San Francisco.

Apr. 29-May 1 Industrial Packaging and Materials Handling Exposition, Industrial Packaging Engineers Assn. of America, Chicago.

The London ECONOMIST

Close-Up of UN

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

o o o

THE weeks that have passed since Secretary Byrnes introduced realism into American dealings with Russia have been full of sound and fury. Whether they have signified nothing or much is still a question. If, as is now rumored, they are about to bear fruit in terms of a deal whereby Russian agreement to German unification is secured in return for a more or less free hand on the Danube, they will at least have achieved a quid pro something. Meanwhile the United States, and particularly New York, has been living through a three-ring international circus which is having an educational effect somewhat different from that which the proponents of close international cooperation might desire.

The settings of that circus are varied to match the prevailing shades of political and economic ideology. The Security Council, since it gave its gymnasium in the Bronx back to Hunter College, has been quartered in a stripped and converted airplane factory 20 miles out on Long Island, on the edge of a village hopefully called Lake Success. Few New York cab drivers have ever heard of it.

The General Assembly meets out in Flushing—a suburban portion of New York also on Long Island and about as far away from the center of town as was the Bronx site. Its quarters there were built by the city for the World's Fair of 1939 (known to its then promoters as the World of Tomorrow) on the surface of an old kitchen midden recently become a golf links. It is now a park. After the Fair closed the city reception building was turned into a skating rink, and in its newest incarnation it has not altogether lost that character.

The mists that rise about it as tired delegates leave its doors after late sessions are variously attributed to the salt air of Flushing Bay which lies to the North, the ghosts of garbage buried under it, and the hot profanity of harried visitors hunting for some means of transportation home.

As for the third ring, the Council of Foreign Ministers is convened in luxury on the thirty-seventh floor of New York's best and most central hotel, which boasts not only a sub-surface garage, but also a sub sub-surface track spur for stationing one's private railway car. So far as has been announced, the Russians have not yet taken advantage of this last facility.

Of these three rings, two are open to the eye of the public and the press. The Foreign Ministers' paradise is closed to both, but performances there are reported through State Dept. officers who communicate their carefully screened observations to American newspaper men at the day's end. (Other nations have other arrangements.)

The press has been properly protestant at this restriction to second-hand news, but from the public's point of view the deprivation is less acute than it would have been were the chief actors not given to appearing, in the other two rings, at the opera, at public dinners, at the magistrate's court when their chauffeurs have been caught speeding, and even at High Mass. The presence of Messrs. Vishinsky, Novikov and three other members of the Soviet delegation at St. Patrick's just after Cardinal Spellman had lashed out at Russia did not pass unnoticed in a town which is beginning to find the ways of international politics not entirely different from methods familiar at home.

THE public attitude, which 10 months ago was compounded of hope, illusion and interest, is now made up of interest, confusion, disillusion and a remnant of almost desperately held hope. People tell each other, as if reciting a litany, that this is the difficult phase, that things will improve, that the United Nations *must* find a way to make and keep the peace because this is the only chance. Public patience is by no means exhausted, and even the Republican victory brought no sign that the nation was growing tired.

On the other hand, there is little evidence that 10 months' familiarity with the United Nations has brought increased admiration for, or understanding of, the international organization. Few people comprehend the separate functions of the Security Council, the General Assembly, the Council of Foreign Ministers, nor are the earnest aided by the fact that the same subjects seem to be discussed over and over again on all three levels, with the same stalemates at the end.

The negative results of first-hand observation show in jests that are handed around, in small incidents that are magnified in the press. That the budget for running the United Nations is smaller than that for cleaning New York streets may be a fact, but it is hardly the kind of comment on which an organization dependent for its success on public admiration thrives.

Nor does it help public relations to have the Secretary-General claim indulgence from a magistrate for his speeding chauffeur. If the one detail seems slightly comic, the other touches the delicately balanced chip on every American shoulder. "Who does he think he is?" goes up in chorus from Maine to California, and Echo has not yet been provided with an answer that satisfies the audience.

TALES of Russian intrasigence are told by taxi drivers and by liberals as well as by business men. Typical of a whole sector of thinking is the one about the Russian subcommittee members who put forward a proposition differing from the one previously presented. After consultation the Americans and the British agreed, and said, "Now that's settled, let's get on

(CONTINUED ON PAGE 140)

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1946

Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	3,528,090	51.1	207,512	47.4	136,452	29.2	3,872,054	49.6	874,053	4.43
February	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4.00
March	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st Quarter	*10,775,732*	*53.8*	*597,366*	*47.0*	*398,520*	*29.4*	*11,771,618*	*51.9*	*915,367*	*12.86*
April	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May	3,699,979	53.6	153,409	35.0	219,064	46.9	4,072,452	52.2	919,289	4.43
June	5,145,594	77.0	251,253	59.2	227,979	50.4	5,624,826	74.4	1,311,148	4.29
2nd Quarter	*14,178,712*	*69.9*	*690,750*	*53.7*	*688,074*	*50.1*	*15,557,536*	*67.9*	*1,195,814*	*13.01*
1st 6 months	*24,954,444*	*61.9*	*1,288,116*	*50.4*	*1,086,594*	*39.8*	*27,329,154*	*59.9*	*1,056,403*	*25.87*
July	6,016,253	87.4	365,332	83.6	228,083	48.9	6,609,668	84.9	1,495,400	4.42
August	6,251,271	90.6	373,837	85.4	261,755	56.0	6,886,863	88.2	1,554,597	4.43
September	5,911,375	88.6	371,465	87.8	235,054	52.1	6,517,894	86.4	1,522,872	4.28
3rd Quarter	*18,178,899*	*88.9*	*1,110,634*	*85.6*	*724,892*	*52.3*	*20,014,425*	*86.5*	*1,524,328*	*13.13*
9 months	*43,133,343*	*71.0*	*2,398,750*	*62.2*	*1,811,486*	*44.0*	*47,343,579*	*68.9*	*1,213,938*	*39.00*
* October	6,268,102	90.8	387,933	88.6	253,562	54.3	6,909,597	88.5	1,559,728	4.43
† November	5,797,258	86.7	318,096	75.0	263,252	58.2	6,378,606	84.4	1,486,855	4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons Bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of January 1, 1946 as follows: Open hearth 81,236,250 net tons, Bessemer 5,154,000 net tons, Electric 5,500,290 net tons, total 91,890,540 net tons.

* Revised.
† Preliminary figures, subject to revision.

YEAR 1945

Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								*Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	*Net tons	*Percent of capacity	Net tons	Percent of capacity	*Net tons	*Percent of capacity	*Net tons	*Percent of capacity		
January	6,469,340	90.5	379,062	76.0	355,910	76.8	7,204,312	88.8	1,626,256	4.43
February	5,968,326	92.4	347,227	77.1	337,212	80.6	6,652,765	90.8	1,663,191	4.00
March	6,927,939	96.9	398,351	79.8	379,639	81.9	7,705,929	95.0	1,739,487	4.43
1st Quarter	*19,365,605*	*93.3*	*1,124,640*	*77.6*	*1,072,761*	*79.7*	*21,563,006*	*91.5*	*1,676,750*	*12.86*
April	6,541,627	94.5	372,952	77.2	375,308	83.6	7,289,887	92.8	1,699,274	4.29
May	6,664,117	93.2	402,100	80.6	383,450	82.7	7,449,667	91.8	1,681,640	4.43
June	6,129,763	88.5	379,807	78.6	330,952	73.7	6,840,522	87.1	1,594,527	4.29
2nd Quarter	*19,335,507*	*92.1*	*1,154,859*	*78.8*	*1,089,710*	*80.0*	*21,580,076*	*90.6*	*1,658,730*	*13.01*
1st 6 Months	*38,701,112*	*92.7*	*2,279,499*	*78.2*	*2,162,471*	*79.9*	*43,143,082*	*91.0*	*1,667,688*	*25.87*
July	6,318,975	88.6	381,832	76.7	284,764	61.6	6,985,571	86.3	1,580,446	4.42
August	5,172,344	72.3	347,088	69.5	215,885	46.6	5,735,317	70.7	1,294,654	4.43
September	5,435,799	78.7	352,847	73.2	193,829	43.3	5,982,475	76.3	1,397,775	4.28
3rd Quarter	*16,927,118*	*79.9*	*1,081,767*	*73.1*	*694,478*	*50.5*	*18,703,363*	*77.8*	*1,424,475*	*13.13*
9 months	*55,628,230*	*88.4*	*3,361,266*	*76.5*	*2,856,949*	*70.0*	*61,846,445*	*86.6*	*1,585,806*	*39.00*
October	5,146,787	72.0	242,122	48.5	207,867	44.8	5,596,776	69.0	1,263,381	4.43
November	5,641,308	81.5	358,664	74.2	200,494	44.7	6,200,466	78.9	1,445,330	4.29
December	5,523,277	77.4	343,266	68.9	191,394	41.4	6,057,937	74.8	1,370,574	4.42
4th Quarter	*16,311,372*	*76.9*	*944,052*	*63.8*	*599,755*	*43.6*	*17,855,179*	*74.2*	*1,358,842*	*13.14*
2nd 6 months	*33,238,490*	*78.4*	*2,025,819*	*68.5*	*1,294,233*	*47.1*	*36,558,542*	*76.0*	*1,391,646*	*26.27*
Total	71,939,602	85.5	4,305,318	73.3	3,456,704	63.4	79,701,624	83.5	1,528,608	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,614,338 net tons open hearth, 112,658 net tons Bessemer and 104,640 net tons electric ingots and steel for castings, total 1,831,636 net tons; based on annual capacities as of January 1, 1945 as follows: Open hearth 84,171,590 net tons, Bessemer 5,874,000 net tons, Electric 5,455,890 net tons, total 95,501,480 net tons.

*Revised January through December, 1945.

Appeals Court Holds Against J & L in Mine Foremen Union Case

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• • • **Passing upon** a proceeding brought by the Jones & Laughlin Steel Corp., the United States Court of Appeals in a unanimous opinion on Dec. 16, declared that the Government had the right to recognize the supervisory employees union as the exclusive collective bargaining representative of the supervisors at the company's four captive mines in the Pittsburgh area after the Government was in possession of the mines.

The company sought to restrain the Government from entering into an agreement with the United Clerical, Technical and Supervisory employees, a division of District No. 50 of the UMW. The agreement in effect recognized it as the exclusive collective bargaining representative of the supervisors at the J&L mines.

Contrary to published reports the court's decision does not pass upon the right of supervisors to unionize as a collective bargaining agency. It does not deal with the legal effect to be given a certification and order of the NLRB.

It does say, however, that the agreement between the Government and the union was limited solely to the period of Government possession of the mines. Rejecting a company contention, the court said that the company is in no position to complain of the action taken by the Government in its capacity as operator of the mines.

The court also denied a company contention that under the existing law a single union cannot lawfully act as exclusive representative of both rank and file employees and their supervisors in a hazardous industry. The court agreed with the NLRB view that the numerous safety regulations prescribed in Pennsylvania's mining code are primarily for the protection of the mine personnel working underground and not for the protection of company property.

The outstanding case to test the right of supervisors to organize as a collective bargaining agency in a private industry is the Packard Motor Co. proceeding now before the Supreme Court.

While the J&L decision does not directly involve this right, it is recognized that the Government's agreement to a supervisors' union might well establish a precedent throughout private industry in coal mines as well as in other operations. It also has been suggested that the decision may bring legislation at the next regular session of Congress through amendment of the Wagner Act or in some other form barring the organization of supervisors and holding them as a part of management, rather than labor.

Says Truman Program Will Up Nonresidential Building by 40 Pct

Washington

• • • **An increase in** permitted nonresidential construction, probably as much as 40 pct, is forecast as a result of President Truman's curtailment of the rigid housing program which has been in effect most of this year.

In his announcement of Dec. 14, the President stated that the emphasis during 1947 will be on rental housing and at the same time wiped out priorities for builders and individuals. However, the allocation of certain scarce materials, such as merchant pig iron and steel, to manufacturers of building materials will be continued through the first quarter of 1947.

Briefly, the housing program for 1947 encompasses the following major steps:

(1) Increased nonresidential construction.

(2) A simple permit system, which will allow any person to build a home.

(3) Ending of priority ratings for builders and individuals. Outstanding priorities will be honored, but the issuance of additional priorities will be discontinued as soon as the permit system gets into operation.

(4) Elimination of the $10,000 ceiling on new homes and relaxation of the $80 rental ceiling.

(5) Immediate review of premium payment plans, with possible elimination of some.

(6) Continuation of guaranteed market plans for industrial and prefabricated housing and for new types of materials.

(7) Continuation of export controls on building materials. Apprentice training and technical research will also be carried forward, according to the Presidential announcement.

NHA expects to begin issuance of the orders necessary to effectuate this program sometime this week.

Sells Alcoa War Plant To Reynolds Metals Co.

Washington

• • • **An aluminum smelting** and casting plant at Newark, Ohio, formerly operated by Alcoa, has been leased by WAA to the Reynolds Metals Co., of Richmond, Va. for a period of 5 yr, it has been announced. War production reached a monthly output of 10 million lb of blooms and 15 million lb of rods.

Built at a cost of nearly $24 million the rentals to be paid by Reynolds are set at 5 pct of net sales with minimums as follows: First year, $200,000, second, $250,000, third, $300,000, fourth, $400,000, and fifth, $500,000.

WAA will put the plant into operating condition at a cost not to exceed $150,000.

Coke Order Amended

Washington

• • • **Under a revision** of Dir 17, M-21, restricting coke deliveries, companies producing coke for their own use or that of an affiliate or subsidiary are not required to give preference to orders from others at the expense of their own requirements.

Also, the amended emergency order provides that only those public sanitary service and gas-producing utilities which have less than 20 days' supply may apply for delivery preference. Although preference orders may be used only to bring inventories up to a 20-day supply, gas utilities may otherwise acquire coke inventories up to a 60-day supply.

At the same time, special authorization is granted the CPA to place preferred orders in the event of a public emergency.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1946

Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	3,528,090	51.1	207,512	47.4	136,452	29.2	3,872,054	49.6	874,053	4.43
February	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4.00
March	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st Quarter	*10,775,732*	*53.8*	*597,366*	*47.0*	*398,520*	*29.4*	*11,771,618*	*51.9*	*915,367*	*12.86*
April	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May	3,699,979	53.6	153,409	35.0	219,064	46.9	4,072,452	52.2	919,289	4.43
June	5,145,594	77.0	251,253	59.2	227,979	50.4	5,624,826	74.4	1,311,148	4.29
2nd Quarter	*14,178,712*	*69.9*	*690,750*	*53.7*	*688,074*	*50.1*	*15,557,536*	*67.9*	*1,195,814*	*13.01*
1st 6 months	*24,954,444*	*61.9*	*1,288,116*	*50.4*	*1,086,594*	*39.8*	*27,329,154*	*59.9*	*1,056,403*	*25.87*
July	6,016,253	87.4	365,332	83.6	228,083	48.9	6,609,668	84.9	1,495,400	4.42
August	6,251,271	90.6	373,837	85.4	261,755	56.0	6,886,863	88.2	1,554,597	4.43
September	5,911,375	88.6	371,465	87.8	235,054	52.1	6,517,894	86.4	1,522,872	4.28
3rd Quarter	*18,178,899*	*88.9*	*1,110,634*	*85.6*	*724,892*	*52.3*	*20,014,425*	*86.5*	*1,524,328*	*13.13*
9 months	*43,133,343*	*71.0*	*2,398,750*	*62.2*	*1,811,486*	*44.0*	*47,343,579*	*68.9*	*1,213,938*	*39.00*
* October	6,268,102	90.8	387,933	88.6	253,562	54.3	6,909,597	88.5	1,559,728	4.43
† November	5,797,258	86.7	318,096	75.0	263,252	58.2	6,378,606	84.4	1,486,855	4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons Bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of January 1, 1946 as follows: Open hearth 81,236,250 net tons, Bessemer 5,154,000 net tons, Electric 5,500,290 net tons, total 91,890,540 net tons.

* Revised.
† Preliminary figures, subject to revision.

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Based on Reports by Companies which in 1945 made 97.6% of the Open Hearth, 100% of the Bessemer and 85.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								*Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	*Net tons	*Percent of capacity	Net tons	Percent of capacity	*Net tons	*Percent of capacity	*Net tons	*Percent of capacity		
January	6,469,340	90.5	379,062	76.0	355,910	76.8	7,204,312	88.8	1,626,256	4.43
February	5,968,326	92.4	347,227	77.1	337,212	80.6	6,652,765	90.8	1,663,191	4.00
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Industrial Briefs...

• CHANGES NAME — Thornton Tandem Co. of Detroit has changed its name to Detroit Automotive Products Corp. In announcing the firm's new name, the board of directors emphasized that "this is a change in name only."

• NEW OFFICE—Karl A. Stein, president of Acme Aluminum Alloys, Inc., Dayton, producer of aluminum castings, announces the opening of a company branch office in the Commercial Trust Bldg., Philadelphia.

• WAA DISPOSAL — The wartime industrial facilities near St. Charles, Ill., except the airport section, has been put up for sale by WAA and proposals for purchase or lease will be opened publicly at noon, Dec. 27. The war plant was used by the Howard Aircraft Co. for construction of Navy planes during the war.

• TO BUY EQUIPMENT—Republic Steel Corp. is planning to spend $200,000 on new equipment for its bar mill at Gadsden, Ala. The equipment will include roller lines and drag-overs.

• BARIUM ACQUISITION — The Barium Steel Corp. announces the acquisition of the Bayonne Bolt Corp., Bayonne, N. J.

• TO BUILD PLANT — Koppers Co., Pittsburgh, announced that its engineering and construction division had been authorized to design and build a polystyrene plant at Kobuta with an annual capacity of 15,000,000 lb. Completion of the new plant is expected in about a year.

• NEW TRADE NAME — Aluminum Co. of America has announced that on and after Jan. 1, 1947, the alumina and fluoride products of Aluminum Ore Co., an Alcoa subsidiary, will be marketed under the "Alcoa" trademark and trade name. The "Alorco" trade name and trademark will be discontinued.

• CONTRACT AWARD — Loewy Construction Co., New York, has been awarded a contract for the building and erection of a complete metal work and rolling mill installation for India.

• OPENS BRANCH OFFICE—The Lindberg Steel Treating Co., Chicago, announces the opening of a branch plant located at 620 Buffalo Road, Rochester, N. Y.

• FISSION PLANT—The United States War Dept. has awarded the contract for the new atomic energy project at Dayton, Ohio, to Maxon Construction Co. The estimated cost of the plant is $5 million and will be operated by Monsanto Chemical Co.

• SMALL RADIOS — Admiral Corp. of Chicago, which makes radios, refrigerators, and household appliances, has purchased a new building in Harvard, Ill., for the manufacture of small radios. Admiral, at present, makes refrigerators in Connersville, Ind. and Tecumseh, Mich. Their electric stove plant is located in Kalamazoo, Mich.

• PURCHASE APPROVED — The Westinghouse Electric Corp. has received final approval from the War Assets Administration for the purchase of the plant at Vanport, Beaver County, Pa., operated during the war by the Curtiss Wright Corp.

• BUYS TITAN METAL—Consolidated Coppermines Corp. has purchased a controlling interest in the Titan Metal Mfg. Co. of Bellefonte, Pa.

• TO PACKAGE COAL—The Chicago Packaged Fuel Co. has contracted with Blaw-Knox Co. for the purchase of a plant to produce "White Glove" packaged fuel, a domestic coal product. Developed to provide a clean and convenient solid fuel for home use, this product is delivered to the user wrapped and sealed in small packages.

AFA to Sponsor Broad Study of Foundry Coke Quality and Behavior

Chicago

• • • **In an effort to** establish a prior-to-use method of evaluating cupola coke quality, the cupola research committee of the American Foundrymen's Assn. will sponsor an intensive study of foundry coke quality and behavior, R. G. McElwee of Vanadium Corp. of America, Detroit, committee chairman, has announced.

As a first step, the project will seek a basis of correlating coke properties with actual operating experience by analysis of data to be acquired under actual melting conditions in a number of cooperating foundries. This data, covering such factors as fuel ratios, air volume, analysis of effluent gases, melting rates and metal temperatures, slag, type of metal produced, cupola construction and the like, will be collected, integrated and analyzed by a research worker to be employed by the committee. Field studies are to be supplemented by laboratory investigations where indicated.

Coke will be subjected to the usual chemical analyses and to shatter, density, rumble, cell structure and other physical tests. To obtain controlled coke of known heredity and careful sizing for the field tests, the committee is seeking the cooperation of producers.

As nearly as practical, data developed by the project will be issued as quarterly reports and, after committee review, will be the basis for further studies.

Members of the committee, in addition to Mr. McElwee, are A. L. Boegehold, head, metallurgical department, General Motors' research laboratories, and E. H. Stilwill, chief metallurgist, Chrysler Corp., Dodge Div., both of Detroit; H. Bornstein, director, testing and research laboratories, Deere & Co., Moline, Ill.; E. C. Jeter, foundry metallurgist, Ford Motor Co., Dearborn, and A. E. Schuh, director of research, U. S. Pipe & Foundry Co., Burlington, N. J.

Construction Steel...

• • • Fabricated steel awards this week included the following:

3730 Tons, Loveland, Col., penstocks for Marys Lake and Estes power plants, Bureau of Reclamation, Denver, Spec. 1347, to Darby Products.

1150 Tons, East Chicago, Ind., Catalyst towers for City Service Oil Co. to American Bridge Co., Pittsburgh.

415 Tons, Russell, Ky., addition to Chesapeake & Ohio car shops, to Pittsburgh Bridge & Iron Works, Pittsburgh.

360 Tons, Odair, Wash., steel warehouse, Grand Coulee Dam, Bureau of Reclamation, Denver, Spec. 1440, to American Bridge Co., Pittsburgh.

350 Tons, Norristown, Pa., Philadelphia Electric Co., bridge at Barbados Island Station, to Phoenix Bridge Co., Phoenixville, Pa.

265 Tons, Aurora, Ill., building for Independent Pneumatic Tool Co. to J. T. Ryerson & Son, Inc., Chicago.

250 Tons, Columbus, Ga., theater and arcade building for Roy E. Martin, to Southern Steel Works Co., Birmingham; Standard Construction Co., Columbus, contractor.

220 Tons, Birmingham, two public school buildings, to Southern Steel Works Co., Birmingham; Daniel Construction Co., Birmingham, contractor.

135 Tons, De Tere, Wis., building for Nicollet Paper Co., to Wisconsin Bridge & Iron Co., Milwaukee.

120 Tons, Long Beach, Calif., casings for storage warehouse, Pier A, Long Beach Outer Harbor, Spec. HD-217, to Pacific Union Marbelite Co., Los Angeles.

• • • Fabricated steel inquiries this week included the following:

600 Tons, Kewanee, Ill., trailers for Martin Machine Co.

200 Tons, Philadelphia, Bornot Cleaners Co. plant addition, due Dec. 18.

• • • Reinforcing bar awards this week included the following:

750 Tons, Chicago, Southwest intercepting sewer to Carnegie-Illinois Steel Corp., Pittsburgh.

600 Tons, Sioux Falls, S. D., veterans' hospital to Ceco Steel Products Co., Omaha, Neb.

450 Tons, Urbana, Ill., Woman's dormitory for University of Illinois; low bidder, Geo. A. Fuller Co.

110 Tons, Guerneville, Calif., bridge across Russian River, through Kiss Crane Co. to San Jose Steel Co.

• • • Reinforcing bar inquiries this week included the following:

555 Tons, Los Angeles, overcrossing on Arroyo Seco Parkway at Sunset Blvd., California Div. of Highways, bids to Jan. 9.

360 Tons, Silver City, N. M., grading and structures, U. S. highway 260; W. T. Bookout Construction Co., Las Vegas, N. M., general contractor.

• • • Sheet piling awards this week included the following:

900 Tons, Milwaukee, Stockhouse No. 5 for the Blatz Brewing Co. to Carnegie-Illinois Steel Corp. through Thompson Starrett, general contractor.

• • • Sheet piling inquiries this week included the following:

395 Tons, Chicago, for 59th St. harbor improvements, Chicago park district. Bids were due Dec. 16.

250 Tons, Chicago, for Santa Fe R.R.

White Collar Union Asks for a 16-Pct Cost of Living Bonus

East Pittsburgh

• • • The white collar union of Westinghouse Electric Corp., boasting 15,000 members, notified the company last week that it wants a 16-pct. "cost of living bonus," and that the Assn. of Westinghouse Salaried Employees wants to negotiate 12 contract issues. The demands were placed by the president of the National Federation of Salaried Employees Union, with which the AWSE is affiliated. The demands by the white collar union seem to anticipate the expected demands of production and maintenance employees represented by the CIO United Electrical Radio and Machine Workers.

The white collar union, basing its demands upon the statistics of the Dept. of Labor, proposes that Westinghouse pay a bonus covering the cost of living increase, and that it be paid separately from individual salaries as a bonus.

The initial cost of the plan would be about $575,000 for the first month, and a 1 pct increase would cost the company about $36,000. Other union demands include: 1. Include all salaried employees in the retirement and pension plan. 2. Grant additional vacation time at the rate of 1 day per year for each year after 10 years. 3. Write the company severance pay policy into the contract. 4. Grant "extra time off bonus" for excellent attendance; 4 days for up to 5 days absence and 2 days for from 5 to 10 days absence. 5. Write into the contract reasons recognized by the company for involuntary absences. 6. Pay employees for travel time between plants when it is in excess of 8 hours in any day. 7. Grant 8c per mile for use of personal automobile. 8. Put overtime schedules on "a sound basis" for all service and engineering engineers. 9. Raise away from home expenses from $6 to $7.50 a day. 10. Adopt a national rate range structure. 11. Add Armistice Day and any new holiday growing out of World War II to the list of paid holidays.

o o o

NEW RUSSIAN STEEL MILL: *One of the big projects of the Russian iron and steel industry is construction of the integrated Transcaucasian Iron and Steel Works, located near Tbilisi, capital of the Georgian Republic. This view shows a worker said to be checking a press in the still incompleted forge shop at the new plant.*

o o o

MACHINE TOOLS

November Showing Estimated as Fair

• • • **Preliminary estimates** of the machine tool industry's performance in November indicate that shipments fell off about 5 pct; orders decreased 10 pct and unfilled orders were reduced about 3 pct. To qualified observers, the industry's November showing was not bad.

The industry has held up pretty well this year; it kept shipments up by pouring about $300,000,000 in new machine tools into industry, and at the same time helped industry absorb great numbers of machine tools from the government-owned surplus. The amount of machine tools absorbed in 1946 suggests that the nation is tooled up for a terrific spurt in production.

Some segments of the machine tool industry already are concerned over the possibility of a steel strike, which would not go as easily with them as did the recent coal dilemma. Aside from shortage of parts, and some reduced schedules, the industry came through the coal strike in good shape. Steel, however, is something else again.

At the same time, there will be a certain advantage for the machine tool industry in the event of a steel strike, in that a new rash of labor difficulties, particularly on a broad scale, will push additional manufacturers into the frame of mind where better equipment is the only answer.

Some members of the industry met with one of the export groups in Washington last week and during the course of the meeting a guest artist from War Assets Administration's export sales department told the representatives that WAA was running advertisements in foreign magazines encouraging purchase of rebuilt machine tools, and announcing that such machines would be available from approved dealers or rebuilders in this country.

Inasmuch as the plan had never been submitted to the industry or the National Machine Tool Builders' Assn. members, the astonishment was quite general. WAA had simply proceeded on the theory that the fixed prices made it possible to rebuild, when as a matter of fact, most machine tool builders find the prices too high to be able to do it without loss. The fixed prices are too high to permit a real rebuilding job by a builder, according to qualified observers.

Some few builders may be able to work the costs of rebuilding out and make a go of it, but most of them probably cannot. In the event they decide to undertake the project, they can sell the machines abroad and get the approved dealer commission; however, if the machines are sold in this country, they do not.

According to WAA, machine tool sales abroad aggregate $30,000,000. which probably represents an acquisition cost of about $60,000,000; recovery was on the basis of about 1400 machine tools.

War surplus machinery which cost the government $27,313,867 has been channeled into private industry by the Cleveland region of WAA through approved machine tool dealers in 11 months of 1946 for a recovery value of $11,928,-266.

An estimated additional million dollars worth will be sold in December of this year and will serve to establish the Cleveland region as one of the leading outlets to industry for this type of surplus property.

More than 350 approved dealers in the Cleveland region act as sales representatives for the government in speeding up the return of surplus machinery to peacetime manufacturing.

Millions of dollars worth of milling machines, lathes, planers, and other machine tools have been declared surplus by the Army, Navy and other agencies, and turned over to WAA for disposal. The sale of these machine tools through approved dealers is considered a valuable adjunct of the disposal program as established clientele are served with a resulting more rapid turnover, WAA officials state. A commission of 12½ pct is paid the dealer by the government which is the estimated cost of moving such items when sold by regular salaried government personnel.

In Boston and the East, December is not turning out as well as all machine tool interests anticipated. There is no discounting the fact the coal strike and its attending developments threw a scare into the metalworking trade from which it has not fully recovered. Loose talk about additional labor troubles early next year is not reassuring. Higher freight and trucking rates coupled with indicated higher steel costs are also unsettling. Some tool makers' representatives report quotations have sunk to the zero point, which means sales the next few months will be few and far between.

On the other hand, not a few producers have backlogs of domestic business, which with export are encouraging. However, a survey would indicate that with tool makers' Boston representatives, business is going down hill. Thanks to wider distribution, most tool makers are holding their own or doing a shade better than last month, but none has enough confidence to go on record with an expressed opinion as to business conditions the first half of next year.

Builders in the Cincinnati area report that in spite of the coal strike and threatened closing down due to lack of power, their production is at the same level as before the strike. However, there is some fear that for the next 30 to 60 days material will become less available, and production will of a necessity slow up. New business is definitely slow and although there are more inquiries now than a year ago, buyers are holding back on commitments because of the unsettled labor situation. Even while deals are being discussed, buyers are refusing to complete orders, because they do not know that their own plant or shop will be working when the deliveries are made. One source indicates, however, that spring should bring a "leveling off" period and that by next summer business should be definitely swinging upward.

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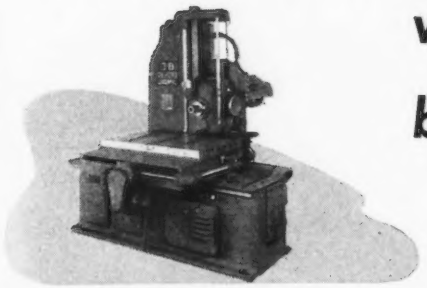
within .0002" Selected Location

by Push Button Controls!



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Greater *Controlled* Accuracy

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Location of work for minimum tool overhang and top performance advantage! Ready accessibility for necessary tool adjustments and changes! Convenience for checking machined dimensions! All these are served by JIGMIL's centralized push button control means which unlocks and retracts the table to open position, then automatically repositions and locks the table to within .0002" of the selected position.

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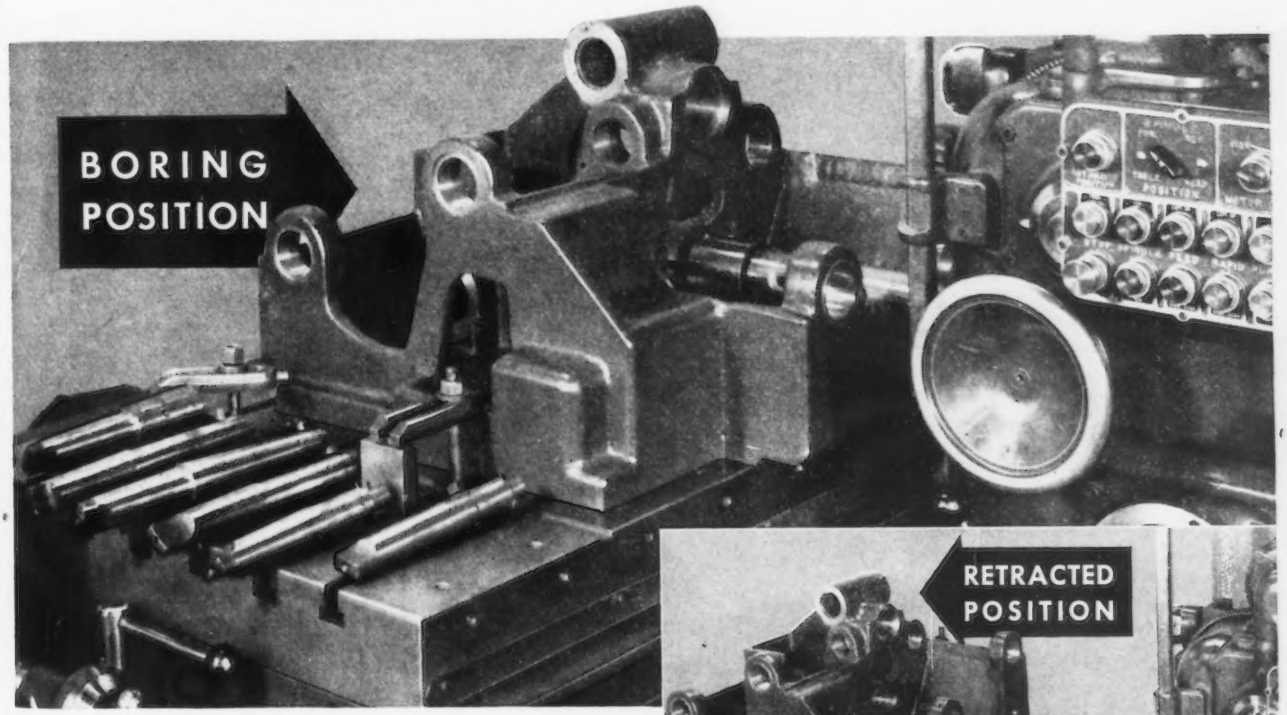

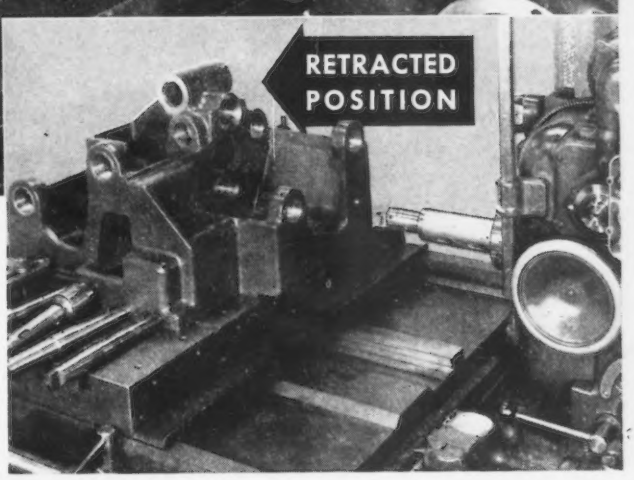

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The work piece above is an intricate casting for a three way diamond boring machine. All holes were bored on a 3-B DeVlieg JIGMIL to size, length and spacing accuracies of within .0001". Of the five castings comprising this particular job, the same high JIGMIL standard of accuracy was maintained throughout for perfect interchangeability of parts!

DeVLIEG MACHINE COMPANY DEVLIEG JIGMIL **450 FAIR AVE. FERNDALE 20, (Detroit) MICH.**

NONFERROUS METALS

. . . News and Market Activities

Lead Price Rises

New York

• • • **Domestic consumers** of lead have paid the equivalent of 12.55c at New York when a producer of foreign lead took business for December and first quarter delivery at 11.00c Tampico, Mexico. Adding freight and the import duty of 1-1/16c brings the price of common lead to 12.55c at New York. Acting on this market news the American Smelting and Refining Co. established a common lead price at 12.55c New York. On Monday the St. Joseph Lead Co. announced a price of 12.35c at St. Louis, or 12.55c at New York. In the past the differential between the St. Louis base price and the New York base price has been established at $3 per ton. However, the new price differential of $4 per ton between basing points has been set to compensate for the new freight tariff for the through rate between the Far West and St. Louis and New York, which has been estimated to cost over $4 per ton.

•

Drop Lead Set-Aside

Washington

• • • **Amendment of** the lead order M-38, to effect the elimination of the 25 pct set-asides of domestic lead production which were formerly required for allocation, has been announced by the Civilian Production Administration.

This action by CPA makes the entire domestic lead production available without allocation for permitted lead uses, including manufacture of storage batteries and chemicals.

Elimination of the set-aside regulation will make about 6,000 tons of lead directly available to industry without CPA allocation. Domestic refinery production, which was subject to the set-aside order, has been averaging about 25,000 tons monthly.

Recent removal of controls on foreign lead purchases and the end of government buying made continuation of allocations no longer feasible the agency explained.

•

Raise Ferroalloys Prices

New York

• • • **Substantially increased** production costs have forced price increases for some ferroalloys, it was announced by Electro Metallurgical Sales Corp. Products affected by the increases include the ferrosilicon alloys, high-carbon ferrochrome, silicomanganese, and chromium, silicon, and manganese briquets. Revised prices become effective Jan. 1 for contract users and immediately for non-contract users.

No price increases are being made in low-carbon ferrochrome, chromium metal, calcium-silicon, calcium - manganese - silicon, and the vanadium, tungsten, and titanium alloys.

Some examples of the increases for carload lots of lump size material, in bulk, are as follows:

High-carbon ferrochrome—old price, 14.50¢ per lb contained chromium; new price 15.60¢.

Ferrosilicon (50 pct)—old price, 7.05¢ per lb contained silicon; new price, 7.45¢.

Ferrosilicon (75 pct)—old price, 8.55¢ per lb contained silicon; new price 9.25¢.

Silicomanganese — old price, 6.05¢ per lb alloy; new price, 6.45¢.

Prices for carload, lump, bulk standard ferromanganese, medium-carbon ferromanganese, low-carbon ferromanganese, and manganese metal show no increase.

Necessarily higher increases ranging in maximum amounts from 10 to 15 pct are being made in the crushed and ground sizes and the less-carload, packed quantities in all cases where revisions apply to offset the relatively much higher crushing and packing costs.

•

Plan New Zinc Refinery

Montreal

• • • **American Quebec** Zinc Refiners Ltd., headed by Howard I. Young, president of American Zinc, Lead & Smelting Co., St. Louis, as president, plans to build a zinc refinery at Arvida, Que., with capacity of 100 tons of high grade electrolytic zinc a day and 70,000 tons of sulphuric acid a year, plus cadmium. The cost of the proposed plant will be $9,500,000, and it is expected that it will be in operation by the spring of 1948. The American company will provide 51 pct of the $1,000,000 working capital and will direct the enterprise. Golden Manitou Mines which operates a zinc-gold-silver-lead-copper producing mine at Val d'Or, Quebec, is acquiring the remaining 49 pct of the common stock.

Aluminum Co. of Canada will rent the new company its Red Mud building at Arvida, which was erected during the war and used in the treatment of tailings. Equipment will be entirely new and installation is expected to start early in 1947.

•

Project Lead Smelter

Montreal

• • • **Quebec Lead** Smelter Syndicate has been formed for the purpose of looking into the establishment of a lead smelter in Quebec and probably in the neighborhood of Arvida. Sponsors of the new syndicate are Ventures Ltd. and a group of associated companies with J. C. Dunlop as syndicate manager. Purpose of the proposed smelter would be to treat lead concentrates from such producers as New Calumet and Golden Manitou Mines and from such other sources as might be available. It also would operate as a customs smelter treating crude lead from other mines. The estimated cost of the proposed smelter is approximately $1,000,000.

Nonferrous Metals Prices

Cents per pound

	Dec. 11	Dec. 12	Dec. 13	Dec. 14	Dec. 16	Dec. 17
Copper, electro, Conn.	19.50	19.50	19.50	19.50	1950	19.50
Copper, Lake, Conn	19.625	19.625	19.625	19.625	19.625	19.625
Tin, Straits, New York	70.00	70.00	70.00	....	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	11.65	11.65	11.65	11.65	12.35	12.35

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb) 15.00
Aluminum pig, f.o.b. shipping point 14.00
Antimony, American, Laredo, Tex. . 23.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be.....$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be.....$30.00
Cadmium, del'd $1.50
Cobalt, 97-99% (per lb)...$1.50 to $1.57
Copper, electro, Conn. Valley 19.50
Copper, lake, Conn. Valley 19.625
Gold, U. S. Treas., dollars per oz..$35.00
Indium, 99.8%, dollars per troy oz.. $2 25
Iridium, dollars per troy oz.....$120.00
Lead, St. Louis 12.35
Lead, New York 12.55
Magnesium, 99.8 + %..... 20.50
Magnesium, sticks, carlots 36.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$89 to $90
Nickel, electro, f.o.b. refinery..... ....
Palladium, dollars per troy oz.....$24.00
Platinum, dollars per troy oz...$60 to $65
Silver, New York, cents per oz.....87.75¢
Tin, Straits, New York..... 70.00
Zinc, East St. Louis 10.50
Zinc, New York 10.94
Zirconium copper, 6 pct Zr, per lb contained Zr .....$ 6.00

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot
No. 115 ..... 20.50
No. 120 ..... 20.00
No. 123 ..... 19.50
80-10-10 ingot
No. 305 ..... 23.50
No. 315 ..... 22.00
88-10-2 ingot
No. 210 ..... 25.75
No. 215 ..... 24.75
No. 245 ..... 21.75
Yellow ingot
No. 405 ..... 16.25
Manganese Bronze
No. 421 ..... 18.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 alum.-sil. alloys:
0.30 copper, max. 17.00
0.60 copper, max. 16.75
Piston alloys (No. 122 type). 16.00—16.50
No. 12 alum. (No. 2 grade). 15.75—16.50
108 alloy ..... 16.00—16.75
195 alloy ..... 16.75—17.25
AXS-679 ..... 16.25—16.75
Steel deoxidizing aluminum, notch-bar, granulated or shot.
Grade 1—95 pct-97½ pct ... 16.75
Grade 2—92 pct-95 pct..... 16.25
Grade 3—90 pct-92 pct 15.75
Grade 4—85 pct-90 pct .... 15.25—15.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed
Cast, oval, 15 in. or longer..... 36⅞
Electrodeposited 30⅝
Rolled, oval, straight delivered.. 31⅛
Curved, 18 in. or longer, delivered 31⅛
Brass, 80-20, frt allowed
Cast oval, 15 in. or longer..... 33⅜
Zinc, Cast, 99.99 ..... 18¾
Nickel, 99 pct plus, frt allowed
Cast 51
Rolled, depolarized 52
Silver, 999 fine
Rolled, 1000 oz lots, per oz..... 93⅞

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbl ....
Copper sulphate, 99.5, crystals, bbls ....
Nickel salts, single, 425 lb bbls, frt allowed 14.50
Silver cyanide, 100 oz lots, per oz 0.749
Sodium cyanide, 96 pct, domestic, 125 lb drums 15.00
Zinc cyanide, 100 lb drums..... 33.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed ..... .0635

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢ 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill)

Sheet and Plate: Ma, FSa, ¼ in.,54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75. Base quantity, 30,000 lb.

Round Rod: M, diam in. ⅛, 55¢; ¼, 47¢; ⅜, 46¢; ½, 45¢; ¾, 44¢; 1¾, 43.5¢; 2, 42.5¢; 3, 41.5¢; 4, 42.5¢ 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. ⅛, 58¢; ¼, 50¢; ⅜, 48¢; ½, 47.5¢; ¾, 46.5¢; 1¾, 45.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in. 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l. 15.40
Ribbon, ton lots 14.50
Plates
Small 13.25
Large, over 12 in. 14.25
Lithographic, ungrained 17.25

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	30.78	....	30.93
Copper, hot-rolled	....	27.28	....
Copper, drawn	....	28.28	....
Low brass, 80 pct	37.52	28.71	29.02
High brass	36.03	27.22	27.53
Red brass, 85 pct	38.03	29.22	29.53
Naval brass	27.50	26.25	32.19
Brass, free cutting	....	22.28	....
Commercial bronze	39.06	30.25	30.56
Manganese bronze	31.07	29.57	35.69
Phosphor bronze, 5 pct	....	49.07	48.82
Muntz metal	27.19	25.94	30.38
Everdur, Herculoy Olympic, etc.	34.45	34.73	35.79
Nickel silver, 5 pct	....	38.11	36.34
Architectural bronze	26.01	....	....

Scrap Metals

(Dealers' buying prices, f.o.b. New York)

Copper and Brass

(Cents per lb)

No. 1 heavy copper and wire..14¾—15¼
No. 2 heavy copper and wire..13¾—14¼
Light copper ..... 12¼—12¾
Auto radiators (unsweated) ..12 —12¼
No. 1 composition ..... 14¼—14¾
No. 1 composition turnings...13¼—13¾
Clean red car boxes ..... 11 —11½
Clocks and faucets ..... 11½—12
Mixed heavy yellow brass .... 9½—10
Old rolled brass ..... 8¾— 9¼
Brass pipe ..... 10¼—10¾
New soft brass clippings ..... 11 —11½
Brass rod ends ..... 9¾—10¼
No. 1 brass rod turnings .... 10 —10½

Aluminum

(Cents per lb)

Alum. pistons with struts .... 4½— 5
Aluminum crankcases ..... 7¼— 7½
2S aluminum clippings ..... 8 — 8¼
Old alum. Sheet & utensils.... 7½— 8
Mixed alum. borings and turnings ..... 2 — 2¼
Misc. cast aluminum ..... 7 — 7½
Dural clips (24S) ..... 6 — 6½

Zinc

(Cents per lb)

New zinc clippings ..... 7 — 7½
Old zinc ..... 5¼— 5¾
Zinc routings ..... 3 — 3⅛
Old die cast scrap ..... 3 — 3¼

Nickel and Monel

(Cents per lb)

Pure nickel clippings .....18 —19
Clean nickel turnings .....14 —15
Nickel anodes .....16½—17½
Nickel rod ends .....17 —18
New Monel clippings .....15 —16
Clean Monel turnings .....10 —10½
Old sheet Monel .....12 —12½
Old Monel castings .....10 —11
German silver clippings, mixed10½—11
German silver turnings, mixed 7 — 7¼

Lead

(Cents per lb)

Soft scrap lead ..... 9½—10
Battery plates (dry) ..... 5¼— 5½

Miscellaneous

(Cents per lb)

Block tin .....60 —
No. 1 pewter .....46 —48
No. 1 auto babbitt .....36 —37
Mixed common babbitt .....12 —12½
Solder joints 13
Siphon tops .....30 —32
Small foundry type .....15 —15½
Monotype .....12½—13
Lino and stereotype .....12 —12½
Electrotype .....10 —10½
New type shell cuttings (nom.)11 —11½
Clean hand picked type shells. 5 — 5½
Lino and stereo dross ..... 5½— 6
Electro dross ..... 3½— 4

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets 14.90
Cut lead sheets 15.40
Lead pipe, manufacturing point.... 14.15
Lead traps and bends....List +33 1/3%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules..List +33 1/3%
Drum traps, U.S. list....List +33 1/3%
Montclair traps .....List +33 1/3%
Lead burned bath traps..List +60%
Lead wool 16.30
Calking lead 13.30

SCRAP

Heavy Melting Steel Prices Soar $5 a Ton

New York

• • • **Fireworks broke lose** on Monday of this week as the price of heavy melting steel smashed its barriers to rise $5 above last week's levels in most districts. The explosion was touched off last Sunday when at least one consumer telephoned brokers to place orders at the higher prices.

Dislocation of scrap tonnages was cited in some circles as the principal reason some consumers decided to step out with higher offers for material delivered to eastern mills. It is known that considerable cross hauling of scrap has been taking place, forcing prices to artificially high levels. These prices actually meant many consumers were paying more than the prices quoted in the various districts, or at least on that portion of their purchases coming from remote points.

While the increase, one of the largest recorded in recent years, was not entirely unexpected, its size came as a distinct shock to many in the scrap trade. Many large consumers appear to have been taken by surprise by the sudden spurt and stayed out of the market during the early part of the week. That there will be some consumer resistance to present levels appears probable, for if scrap prices remain long at the new level steel prices are bound to be affected.

Early in the week the effect of the heavy melting price zoom was so great that little heed was given to the lighter steel grades and they were left by the wayside in many districts. Cast grades moved up sharply in only a few spots.

•

PITTSBURGH—The scrap market in Pittsburgh is chaotic this week, with rumors and counter-rumors of price advances that are almost fantastic. Dealer offerings of $27.50 for No. 1 heavy melting have been reported and an offer to a mill of No. 1 at $32.50 a ton, delivered, was likewise reported. Dealers and brokers have retreated from the firing line, holding what is on hand to await developments and, incidentally, to await the new year. By that time they hope that the price situation will be somewhat settled. In the face of a rapidly advancing market, its peak is an unknown factor that may take a week to evolve. There was a reported sale of railroad specialties at $36.50 in this district during the past week.

•

CHICAGO—The market continues to be strong and generally confused. The last railroad list went at high prices. Generally, the mills have put a $4.50 maximum springboard on anything that comes into this area, but there have been a few exceptions to this. The fact that new material continues to be drawn into the scrap picture has further beclouded the market. The scrap at the reported $27 price, which was purchased by brokers, and suddenly stopped, didn't find its way to the large mills as No. 1 heavy melting early in the week. Consumers have now agreed to continue to accept $25.50 heavy melting scrap with the new expiration date rumored as Jan. 10. The price increase in the eastern districts had not hit the market here early this week.

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PHILADELPHIA—Steel scrap is in great demand and the pressure of consumers, particularly in other districts, has served to force up heavy melting grades by $5 a ton. Low phos is $2.50 a ton higher. It is understood that a principal consumer took the initial step in offering this significant increase in mill buying prices over the week end.

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NEW YORK—The market here was given a terrific spurt over the last weekend when at least one consumer placed substantial orders on Sunday, leading to a price jump of approximately $5 for heavy melting steel. One large broker was paying $25.50 for heavy melting steel in Brooklyn early this week, with the price reported to be $26.50 in northern New Jersey. Unprepared heavy steel was selling at $21.00. Cast grades and the lighter steel grades did not share in the upward movement early in the week.

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DETROIT—Large Detroit scrap buyers attempting to hold the price line, while successful thus far, are being subjected to terrific pressure both from outside steel mills and deals involving trades of scrap for sheet steel. Prices $5 above existing levels have been reported for limited tonnages. The scrap-for-steel type transaction is today reported to be one of the most important factors in determining scrap prices and constitutes a threat to continue operations of Detroit mills. Foundry cast grades continue to be scarce with most prices reported in the vicinity of $40 per net ton.

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CLEVELAND—In a market described by one buyer as "the craziest I've ever seen" prices are moving fast. Conflicting reports of a buy on No. 1 heavy melting at $35 by a Valley consumer along with some other fancy prices paid by an eastern consumer completely upset a scrap market that has been thin for the last 2 weeks. However, the $35 price report proved to be unfounded. Some of the major consumers are out of the market for the time being at least.

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BOSTON—Demand is so urgent and supply so limited, cast has lost all quality distinction. Going quotations range all the way from $40 a ton to $45 on anything, the top price representing an advance of $5 a ton for the week. As for other kinds of scrap, prices have not changed, despite the fact the trade is talking more money. Any advance, however, has been retarded by a slightly freer movement.

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BUFFALO—Interest in the market was raised to fever pitch this week by reports that one of the leading local consumers had placed orders for heavy steel making grades at advances of $4.75 a ton or $28.50 to $29.00 delivered. There was no indication, however, that the light end of the list had benefited to the same extent. It was believed this latest upturn would bring out more reluctant scrap and other mills were expected to fall in line without much hesitancy. For the time being the spotlight was taken away from cast iron, although items in this category continued strong. Demand for low phos scrap, on the other hand, was reported extremely sluggish.

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ST. LOUIS—Further sharp increases in scrap iron prices were reported in the St. Louis industrial district early this week. Mills agreed to pay $1 a ton more for melting grades because of higher prices prevailing in the Chicago and eastern markets and demand brought up prices of other items. The movement has been disappointing as some country shippers continue to hold supplies for higher prices and others are holding back because of a desire to hold down taxes this year. St. Louis Southwestern has a list of 1500 tons and the Missouri, Kansas & Texas 10 carloads.

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CINCINNATI—Despite price lures no greater volume of material is coming out at the present time. Further advances in quotations are likely, though no substantial definite sales had been reported here early this week. Rumors of hard pressed consumers accepting scrap bearing higher freight rates have not been confirmed, but appear not unlikely.

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BIRMINGHAM—Flow of steel scrap generally is considerably below normal here with specialty items such as rail crops and angle bars moving north for higher prices. Although open hearth steel grades have been held to a $5 a ton increase over the old OPA ceiling, heavy pressure for additional price advances is being exerted.

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TORONTO—Scrap iron and steel receipts failed to show noticeable improvement over the past several days and dealers continue to report difficulty in meeting demand. However, there have been better offerings of industrial plant scrap and fairly large quantities of light bundling materials are appearing on the market. Cast scrap and stove plate continue scarce and fresh offerings are less than 25 pct of requirements. Consumers

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Pending establishment of a market in some districts and in certain grades, the former OPA ceiling price is inserted for reference, followed by an asterisk.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.00 to $30.50
RR. hvy. melting	30.00 to 30.50
No. 2 hvy. melting	30.00 to 30.50
RR. scrap rails	26.50 to 27.00
Rails 3 ft. and under	28.50 to 29.00
No. 1 comp'd bundles	30.00 to 30.50
Hand bdld. new shts.	30.00 to 30.50
Hvy. axle turn.	24.50 to 25.00
Hvy. steel forge turn.	24.50 to 25.00
Mach. shop turn.	20.00 to 20.50
Short shov. turn.	22.00 to 22.50
Mixed bor. and turn.	20.00 to 20.50
Cast iron borings	20.00 to 20.50
No. 1 cupola cast	34.00 to 36.00
Heavy breakable cast	25.00 to 25.50
Malleable	29.00 to 29.50
RR. Knuck, and coup.	30.00 to 30.50
RR. coil springs	30.00 to 30.50
Rail leaf springs	30.00 to 30.50
Rolled steel wheels	30.00 to 30.50
Low phos.	30.00 to 30.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$25.00 to $25.50
No. 2 hvy. melting	25.00 to 25.50
No. 1 bundles	25.00 to 25.50
No. 2 dealers' bndls.	25.00 to 25.50
Bundled mach. shop turn.	25.00 to 25.50
Galv. bundles	23.00 to 23.50
Mach. shop turn.	20.00 to 20.50
Short shovels, turn.	21.50 to 22.00
Cast iron borings	20.50 to 21.00
Mix. borings & turn.	19.50 to 20.00
Low phos. hvy. forge	28.00 to 30.00
Low phos. plates	27.00 to 27.50
No. 1 RR. hvy. melt.	24.75 to 27.25
Reroll rails	34.50 to 35.00
Miscellaneous rails	33.50 to 34.00
Angles & splice bars	33.25 to 33.75
Locomotive tires, cut	24.25*
Cut bolsters & side frames	29.00 to 29.50
Standard stl. car axles	31.00 to 31.50
No. 3 steel wheels	29.00 to 29.50
Couplers & knuckles	28.50 to 29.00
Malleable	35.00 to 40.00
No. 1 mach. cast	37.50 to 42.00
Rails 3 ft. and under	36.50 to 37.00
No. 1 agricul. cast	30.00 to 35.00
Hvy. breakable cast	30.00 to 35.00
RR. grate bars	31.50 to 32.00
Cast iron brake shoes	30.00 to 30.50
Stove plate	33.50 to 34.00
Clean auto cast	31.00 to 31.50
Cast iron carwheels	30.50 to 31.00

CINCINNATI

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

No. 1 hvy. melting	$23.70
No. 2 hvy. melting	23.70
No. 1 bundles	23.70
No. 2 bundles	23.70
Mach. shop turn.	$15.50 to 16.00
Shoveling turn.	17.50 to 18.00
Cast iron borings	16.50 to 17.00
Mixed bor. & turn.	16.50 to 17.00
Low phos. plate	27.00
No. 1 cupola cast	30.00
Hvy. breakable cast	25.00
Stove plate	28.00
Scrap rails	26.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$20.35
No. 2 hvy. melting	20.35
Nos. 1 and 2 bundles	20.35
Busheling	20.35
Turnings, shovelings	$17.00 to 17.35
Machine shop turn.	15.00 to 15.35
Mixed bor. & turn.	15.00 to 15.35
Cl'n cast, chem. bor.	16.50 to 17.00
No. 1 machinery cast	40.00 to 45.00
Heavy breakable cast	40.00 to 45.00
Stove plate	40.00 to 45.00

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$22.32
No. 2 hvy. melting	22.32
No. 1 bundles	22.32
New busheling	22.32
Flashings	22.32
Mach. shop turn	17.32
Short shov. turn	19.32
Cast iron borings	18.32
Mixed bor. & turn.	17.32
Low phos. plate	24.82
No. 1 cupola cast	$42.50 to 45.00
Charging box cast	41.50 to 43.50
Hvy. breakable cast	38.50 to 40.50
Stove plate	41.50 to 43.50
Automotive cast	41.00 to 45.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$28.00 to $30.00
No. 2 hvy. melting	28.00 to 30.00
No. 1 bundles	28.00 to 30.00
No. 2 bundles	28.00 to 30.00
Mach. shop turn.	18.75 to 19.25
Shoveling turn.	21.25 to 21.75
Cast iron borings	18.75 to 19.25
Mixed bor. & turn.	18.75 to 19.25
No. 1 cupola cast	40.00 to 41.00
Hvy. breakable cast	36.00 to 37.00
Cast. charging box	37.00 to 38.00
Clean auto cast	40.00 to 41.00
Hvy. axle forge turn.	23.75 to 24.25
Low. phos. plate	30.50 to 32.50
Low phos. punchings	30.50 to 32.50
RR. steel wheels	33.00 to 35.00
RR. coil springs	33.00 to 35.00
RR. malleable	35.00 to 40.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$23.50
Bundled sheets	23.50
Mach. shop turn.	19.00
Locomotive tires, uncut	25.00
Misc. std. sec. rails	$32.00 to 34.00
Rerolling rails	34.00 to 35.00
Steel angle bars	30.00 to 31.00
Rails 3 ft. and under	35.00 to 36.00
RR. springs	31.00 to 32.00
Steel car axles	30.00 to 31.00
Stove plate	30.00 to 35.00
Grate bars	30.00 to 32.50
Brake shoes	25.00 to 26.00
Malleable	38.00 to 40.00
Cast iron carwheels	32.00 to 33.00
No. 1 mach'ery cast	35.00 to 40.00
Breakable cast	27.50 to 30.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.00 to $22.50
No. 2 hvy. melting	22.00 to 22.50
No. 2 bundles	22.00 to 22.50
No. 1 busheling	22.00 to 22.50
Long turnings	15.00 to 16.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	16.00 to 17.00
Bar crops and plate	24.18 to 25.18
Structural and plate	24.18 to 25.18
No. 1 cast	34.00 to 38.00
Stove plate	30.00 to 35.00
Steel axles	23.00 to 23.50
Scrap rails	24.50 to 25.00
Rerolling rails	26.50 to 27.00
Angles & splice bars	25.50 to 26.50
Rails 3 ft & under	30.00 to 32.00
Cast iron carwheels	22.00*

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.00 to $30.50
No. 2 hvy. melting	30.00 to 30.50
Low phos. plate	32.50 to 33.00
No. 1 busheling	28.00 to 28.50
Hydraulic bundles	30.00 to 30.50
Mach. shop turn.	25.00 to 25.50
Short. shovel. turn.	27.00 to 27.50
Cast iron borings	26.00 to 26.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$25.50
No. 2 hvy. melting	25.50
Comp. black bundles	25.50
Comp. galv. bundles	18.33
Mach. shop turn.	15.33
Mixed bor. & turn.	15.33
Shoveling turn.	17.33
No. 1 cupola cast	$36.00 to 37.00
Hvy. breakable cast	25.00 to 27.00
Charging box cast	36.00 to 37.00
Stove plate	36.00 to 37.00
Clean auto cast	36.00 to 37.00
Unstrip. motor blks.	25.00 to 27.00
Cl'n chem. cast bor.	19.33

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$28.50 to $29.00
No. 1 bundles	28.50 to 29.00
No. 2 bundles	28.50 to 29.00
No. 2 hvy. melting	28.50 to 29.00
Mach. shop turn.	18.75 to 19.25
Shoveling turn.	20.75 to 21.25
Cast iron borings	19.75 to 20.25
Mixed bor. & turn.	18.75 to 19.25
No. 1 cupola cast	35.00 to 40.00
Charging box cast	30.00
Stove plate	30.00 to 35.00
Clean auto cast	28.00 to 30.00
Malleable	29.00 to 29.50
Low. phos. plate	30.00 to 31.00
Scrap rails	25.75 to 26.25
Rails 3 ft. & under	27.75 to 28.25
RR. steel wheels	28.75 to 29.25
Cast iron carwheels	30.00 to 32.00
RR. coil & leaf spgs.	28.75 to 29.25
RR. knuckles & coup.	28.75 to 29.25
No. 1 busheling	24.25 to 24.75

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	29.50 to 30.00
Compressed sheet stl.	29.50 to 30.00
Drop forge flashings	29.00 to 29.50
No. 2 bundles	29.50 to 30.00
Mach. shop turn.	24.50 to 25.00
Short shovel.	26.50 to 27.00
No. 1 busheling	29.50 to 30.00
Steel axle turn.	29.00 to 29.50
Cast iron borings	25.50 to 26.00
Mixed bor. & turn.	24.50 to 25.00
No. 2 busheling	27.00 to 27.50
No. 1 machinery cast	34.50 to 35.00
Malleable	32.50 to 33.00
Railroad cast	34.50 to 35.00
Railroad grate bars	29.50 to 30.00
Stove plate	32.00 to 32.50
RR. hvy. melting	25.50 to 26.00
Rails 3 ft. & under	31.50 to 32.00
Rails 18 in. & under	33.50 to 34.00
Rails for rerolling	30.50 to 31.00
Elec. furnace punch	27.00 to 27.50

SAN FRANCISCO

Per gross ton delivered to consumer:

Cast grade f.o.b. shipping point

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	19.50*
No. 1 cupola cast.	25.00*
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

Cast grade f.o.b. shipping point

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
No. 1 cupola cast	25.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

Cast grade f.o.b. shipping point

No. 1 & No. 2 hvy. melting	$17.00
Elec. furn. 1 ft. und.	17.00
No. 1 cupola cast	25.00*
RR. hvy. melting	16.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

[Advances over past week in **Heavy Type**, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.]

Flat-Rolled Steel: (cents per pound)	Dec. 17, 1946	Dec. 10, 1946	Nov. 12, 1946	Dec. 18, 1945
Hot-rolled sheets	2.50	2.50	2.425	2.20
Cold-rolled sheets	3.20	3.20	3.275	3.05
Galvanized sheets (10 ga.)	3.55	3.55	4.05	3.70
Hot-rolled strip	2.50	2.50	2.35	2.10
Cold-rolled strip	3.20	3.20	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40
Wire and Wire Products: (cents per pound)*				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails: (dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.39	$43.00*
Light rails	49.18	49.18	49.18	45.00*
*per gross ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$39.00	$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

Pig Iron: (per gross ton)	Dec. 17, 1946	Dec. 10, 1946	Nov. 12, 1946	Dec. 18, 1945
No. 2, foundry, Phila.	$32.43	$32.43	$30.43	$27.59
No. 2, Valley furnace	30.50	30.50	28.50	25.75
No. 2, Southern, Cin'ti	29.80	29.80	27.80	26.19
No. 2, Birmingham	26.88	26.88	24.88	22.13
No. 2 foundry, Chicago†	30.50	30.50	28.50	25.75
Basic, del'd eastern Pa.	31.93	31.93	29.93	27.09
Basic, Valley furnace	30.00	30.00	28.00	25.25
Malleable, Chicago†	30.50	30.50	28.50	25.75
Malleable, Valley	30.50	30.50	28.50	25.75
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$30.25	$25.25	$25.25	$20.00
Heavy melt'g steel, Phila.	29.00	24.50	24.00	18.75
Heavy melt'g steel, Ch'go	25.25	25.25	24.00	18.75
No. 1 hy. comp. sheet, Det.	22.32	22.32	17.32	17.32
Low phos. plate, Youngs'n	32.75	27.75	22.50	22.50
No. 1, cast, Pittsburgh	35.00	34.50	29.00	20.00
No. 1 cast, Philadelphia	40.50	40.50	35.00	20.00
No. 1 cast, Chicago	39.75	39.75	29.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$8.75	$8.75	$8.75	$7.50
Foundry coke, prompt	8.50	8.50	8.50	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	19.50	19.50	17.50	12.00
Copper, Lake, Conn.	19.625	19.625	17.50	12.00
Tin, Straits, New York	70.00	70.00	52.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	12.35	11.65	10.35	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic			35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	23.50	23.50	23.50	14.50

Composite Prices . .

[Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.]

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Dec. 17, 1946	2.75655¢ per lb.	$30.14 per gross ton	$28.17 per gross ton
One week ago	2.72122¢ per lb.	$30.14 per gross ton	$25.00 per gross ton
One month ago	2.70711¢ per lb.	$28.13 per gross ton	$24.42 per gross ton
One year ago	2.44104¢ per lb.	$25.37 per gross ton	$19.17 per gross ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1946	2.75655¢ Dec. 17	2.54490¢ Jan. 1	$30.14 Dec. 10	$25.37 Jan. 1	$28.17 Dec. 19	$19.17
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	$18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35967¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 15	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 13	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

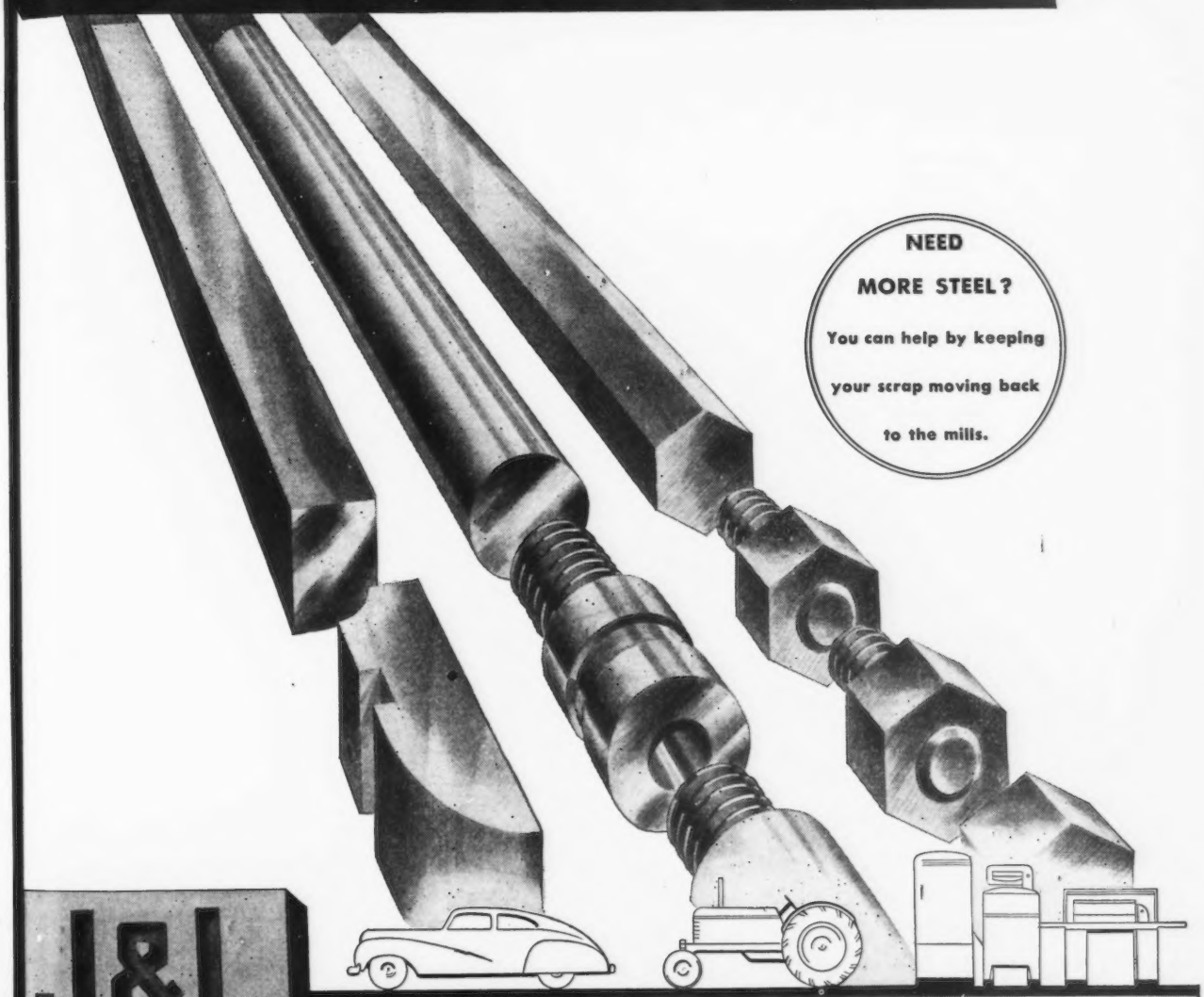
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia, and Chicago.

J&L COLD FINISHED STEEL

FOR EASILY MACHINED · ACCURATE PARTS



J&L STEEL

In addition to improved machinability and longer tool life obtained through use of J&L Cold Finished steel, many manufacturers specify this precision product for its improved surface finish. They also obtain in J&L cold drawn and cold rolled bars and special shapes the higher physical qualities needed for parts of modern high-speed machines. J&L engineers and metallurgists will be glad to assist you with your production problems. Write or phone your nearest J&L office.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PA.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6 (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$48.69	$48.69				$48.69	(Bethlehem, Massillon, Canton, Coatesville=$48.69)								
BILLETS, BLOOMS, SLABS							(Provo=$50.20, Duluth=$41[14])								
Carbon, rerolling	$39	$39	$39	$39	$39	$39	$39	$39				$51.50[14]	$41.50		
Carbon, forging billets	$47	$47	$47	$47	$47	$47	(Provo=$58.20, Duluth=$49[14]) $47					$59.50[14]	$49.50		
Alloy	$58.43	$58.43				$58.43	(Bethlehem, Massillon, Canton=$58.43)						$80.93		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15]															
No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢	(Worcester=2.40¢)					2.585¢	2.835¢			
SHEETS															
Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.875¢	2.50¢		3.085¢	2.635¢	2.76¢	2.69¢
Cold-rolled [1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢			3.885¢	3.335¢	3.560¢	3.560¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢	3.55¢	3.55¢	3.65¢			4.135¢		3.81¢	3.74¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢			4.235¢	3.685¢	3.95¢	3.91¢
Enameling (10 gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢			3.885¢	3.335¢	3.60¢	3.56¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢									4.335¢		3.95¢	3.91¢
STRIP															
Hot-rolled [3]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢			2.50¢		3.185¢	2.635¢	2.90¢	2.86¢
Cold-rolled [4]	3.20¢	3.30¢		3.20¢			3.20¢						3.335¢	3.60¢	3.56¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.95¢	
TINPLATE															
Standard cokes, base box	$5.00	$5.00	$5.00		$5.10			$5.10	$5.10					$5.375	$5.301[11]
Electro, box { 0.25 lb / 0.50 lb / 0.75 lb }	Deduct 65¢ from standard coke base box price. Deduct 50¢ from standard coke base box price. Deduct 35¢ from standard coke base box price.														
BLACKPLATE															
29 gage [5]	3.30¢	3.30¢	3.30¢		3.40¢			3.40¢	3.40¢					3.67¢	3.59¢
TERNES, MFG.															
Special coated, base box	Deduct 70¢ from standard coke base box price.														
CAN MAKING QUALITY															
Blackplate 55 to 70 lb	Deduct $1.30 from standard coke base box price.														
BARS															
Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	(Duluth=2.70¢) (Provo, Utah=3.30¢)			2.985¢	3.285¢	2.735¢	2.94¢	2.96¢
Rail steel [6]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢					2.135¢	3.435¢			
Reinforcing (billet) [7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢			2.835¢	2.885¢	2.585¢	2.71¢	2.79¢
Reinforcing (rail) [7]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢				2.985¢	3.035¢	2.735¢		
Cold-finished [8]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢	(Detroit=3.15¢) (Toledo=3.25¢)							3.44¢	3.46¢
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢	(Bethlehem, Massillon, Canton=2.92¢)					3.055¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.765¢		
PLATE								(Coatesville, Claymont=2.50¢ Geneva Utah=2.65¢)							
Carbon steel [13]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢			2.885¢	3.085¢	2.755¢	2.71¢	2.558¢
Floor plates	3.75¢	3.75¢									4.135¢	4.435¢		4.15¢	4.15¢
Alloy	3.79¢	3.79¢			(Coatesville=3.79¢)						4.305¢	4.525¢		4.01¢	3.895¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Geneva, Utah=2.50¢) (Bethlehem=2.35¢)				2.735¢	3.035¢		2.54¢	2.48¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.05¢			3.05¢			(Worcester=3.25¢)								
0.51 to 0.75 carbon	4.65¢			4.65¢			(Worcester=4.85¢)								
0.76 to 1.00 carbon	6.65¢			6.65¢			(Worcester=6.85¢)								
1.01 to 1.25 carbon	9.03¢			9.03¢			(Worcester=9.23¢)								
WIRE [9]															
Bright [12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢) (Duluth=3.10¢)					3.585¢		3.44¢	3.41¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.00¢	4.00¢		4.00¢			(Worcester=4.10¢)			(Trenton=4.25¢)		4.535¢		4.39¢	4.339¢
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢						3.235¢		2.99¢	3.01¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Ft. Wayne, Titusville	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.26	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	36.79	28.67	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.28
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.28
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.50
Angle splice bars, 100 lb	3.00
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$2.85
Light rails (from rail steel)	2.75
	base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.70¢
Track bolts	6.50¢
Track bolts, heat treated, to railroads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	....
Inconel-clad		
10 pct, f.o.b. Coatesville	26.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.96	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard, galvanized and coated nails	$3.75	$4.25
Cut nails, carloads	4.85	....
	base per 100 lb	
Annealed fence wire	$3.75	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	79	97
Fence posts, carloads	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	89	99
Twisted barbless wire	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50c a ton.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	.. ..
Sheets									
Hot-rolled	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	.....
Cold-rolled	4.525	4.525	4.525	.....	4.525	4.525	4.525	4.525	5.225*
Galvanized	.....	.....	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 6-in.	3.60	3.60	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in & under	3.70	3.70	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled	4.30	.....	4.30	.....	4.40	.....	4.30	4.30	5.00*
Commodity	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes	.....	3.45	.....	.....	3.45	3.45	3.45	3.45	.....
Beams	.....	3.45	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled	3.70	3.70	3.70	.....	.....	3.70	3.70	3.732†‡	.....
Cold rolled	.....	.....	.....	.....	.....	.....	.....	4.382†‡	.....
Bar shapes	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)									
Structural	.....	.....	.....	.....	.....	.....	.....	$74.65†	.....
Forging	.....	.....	.....	.....	.....	.....	.....	$82.23†	.....

* 21 gage and lighter. † Alloy extras apply. ‡ Add 0.379¢ for forging or heat treating grade.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe)
Base price—$200.00 per net ton

	Black	Galv.
Steel (buttweld)		
½-in.	60½	48
¾-in.	63½	52
1-in. to 3-in.	65½	54½
Wrought Iron (buttweld)		
½-in.	17⅞	+4⅜
¾-in.	24¼	2⅞
1-in. and 1¼-in.	28⅝	9⅛
1½-in.	33	11⅞
2-in.	32⅜	11⅜
Steel (lapweld)		
2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½
Wrought Iron (lapweld)		
2-in.	24⅞	4⅞
2½-in. to 3½-in.	25⅞	7½
4-in.	28⅛	11⅝
4½-in. to 8-in.	27	10¼
Steel (butt, extra strong, plain ends)		
½-in.	58½	47½
¾-in.	62½	51½
1-in. to 3-in.	64	54
Wrought Iron (same as above)		
½-in.	18⅞	+1⅝
¾-in.	25⅝	4¾
1-in. to 2-in.	33	13
Steel (lap, extra strong, plain ends)		
2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53
Wrought Iron (same as above)		
2-in.	28½	8⅝
2½-in. to 4-in.	34	16¼
4½-in. to 6-in.	32⅝	14⅝

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2½ in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3½ in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over.....Base
30,000 lb or ft to 39,999 lb or ft.... 5 pct
20,000 lb or ft to 29,999 lb or ft....10 pct
10,000 lb or ft to 19,999 lb or ft....20 pct
5,000 lb or ft to 9,999 lb or ft....30 pct
2,000 lb or ft to 4,999 lb or ft....45 pct
Under 2,000 lb or ft.....65 pct

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago	$74.33
6-in. to 24-in., del'd New York	73.60
6-in. to 24-in., Birmingham	65.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less	88.40

Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Add 18 pct for bolts up to ⅝ in. diam and 6 in. long. In larger sizes, add 15 pct.

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller.....62
9/16 to 1 in. inclusive.....59
1⅛ to 1½ in. inclusive.....57
1⅝ in. and larger.....56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
⅛ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts loose	71 and 10
In packages	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$4.75
F.o.b. Lebanon, Pa.	4.90

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws *(In packages)*	Percent Off List Consumer
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, bessemer	$5.45
Old range, non-bessemer	5.30
Mesaba, bessemer	5.20
Mesaba, non-bessemer	5.05
High phosphorus	5.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113.

These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots f.o.b. shipping point.

Brass, minus 100 mesh	19¼¢ to 21½¢
Copper, electrolytic, 100 and 375 mesh	23½¢ to 27½¢
Copper, reduced, 150 and 200 mesh	22¾¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.70
Aluminum, 100, 200 mesh, carlots	25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.75
Chromium, 100 mesh and finer	$1.35
Lead, 100, 200 & 300 mesh	13¼¢ to 16¾¢
Manganese, minus 325 mesh and coarser	44¢ to 61¢
Nickel, 150 mesh	51½¢
Silicon, minus 325 mesh and coarser	26¢ to 55¢
Solder powder, 100 mesh	81½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$3.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb	$2.65
Under 100 lb	$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$8.75
Connellsville, Pa., hand drawn	9.35
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.63
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads Per 1000
Super-duty brick, St. Louis	$81.00
First quality, Pa., Md., Ky., Mo., Ill., Ohio	65.00
First quality, New Jersey	70.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	59.00
Sec. quality, New Jersey	62.00
Sec. quality, Ohio	57.00
Ground fire clay, net ton, bulk	9.50

Silica Brick

Pennsylvania and Birmingham	$65.00
Chicago District	74.00
Silica cement, net ton (Eastern)	11.50
Chicago	12.50

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	22.00
in sacks	26.00

Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa 10.05
Midwest, add 10¢; Mo. Valley, add 20¢

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb. These prices do not include changes, if any, based on recent mill price increases.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	Hot-Rolled 6 in. and Under	Hot-Rolled Over 6 in.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A-8617-20	Hot-Rolled, A-8742-50 Ann.	Cold-Drawn, A-8617-20	Cold-Drawn, A-8742-50 Ann.
**Philadelphia	$3.774	$5.139	$5.249*	$4.314	$4.214	$5.064	$3.875	$3.937	$4.114	$4.564	$6.287	$7.387	$7.664	$8.764
New York	3.856	4.869	5.501	4.375	4.275	5.075	4.049	4.038	4.134	4.584	6.338	7.438	7.684	8.784
Boston	4.05	5.031	5.725	4.518	4.418	4.985	4.203	4.023	4.356	4.656	6.503	7.603	7.756	8.856
Baltimore	3.64	5.118	5.365	4.293	4.193	....	3.865	4.05	4.093	4.543	....	....	....	....
Norfolk	4.037	....	5.862	4.577	4.477	....	4.262	4.303	4.377	4.677	....	....	....	....
Chicago	3.475	4.425	5.40	3.95	3.85	4.90[6]	3.80	....	3.75	4.20	6.05	7.15	7.20	8.30
Milwaukee	3.633	4.583	5.558	4.108	4.008	5.058[6]	3.958	3.958	3.908	4.358	6.308	7.408	7.458	8.558
Cleveland	3.575	....	5.347	3.95	3.85	....	3.65	3.88	3.60	4.20	6.277	7.377	7.20	8.30
Buffalo	3.575	4.625	5.20	4.211	4.111	4.961	3.921	3.85	3.60	4.20	6.05	7.15	7.20	8.30
Detroit	3.71	4.76	5.526	4.085	3.985	4.95	3.935	3.987	3.735	4.285	6.456	7.556	7.585	8.685
Cincinnati	3.671	4.721	5.296	4.046	3.946	5.002	3.952	3.983	3.902	4.502	6.441	7.541	7.602	8.702
St. Louis	3.643	4.593	5.622	4.118	4.018	5.222	3.968	3.968	3.918	4.522	6.472	7.572	7.622	8.722
Pittsburgh	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	6.05	7.15	7.20	8.30
St. Paul	3.817	4.767	5.666	4.292	4.192	5.000	4.142	4.142	4.092	4.852	....	6.322	7.952	8.052
Duluth	3.817	4.767	5.666	4.292	4.192	....	4.142	4.142	4.092	....	6.472	6.572	....	....
Omaha	4.045	5.72	6.00	4.52	4.42	....	4.37	4.37	4.32	4.945	....	....	....	....
Indianapolis	3.775	4.825	5.40*	4.15	4.05	5.03	3.92	3.92	3.87	4.47	6.17	....	7.32	....
Birmingham	3.675	....	5.20	4.05	3.95	....	3.80	3.80	3.75	4.354	6.414	7.514	7.564	8.614
Memphis	4.221	....	5.746	4.596	4.496	....	4.346	4.346	4.296	4.821	....	....	....	....
New Orleans	4.359*	5.40[1]	5.884	4.734	4.634	....	4.484	4.484*	4.434*	5.175	....	....	....	....
Los Angeles	4.885	6.635[1]	6.585	5.335	5.235	....	4.835	4.735	4.685	6.065	....	....	....	....
San Francisco	4.435	6.035	6.585	4.885	4.785	....	4.535	4.385	4.435	5.815	....	....	....	....
Seattle	4.905[5]	7.305[2]	6.435	4.635	4.535	....	5.035[5]	4.735[5]	4.635[5]	6.265	7.735[5]	8.735[5]	....	9.585[5]
Portland	4.905[4]	...[2]	6.235	5.135	....	....	5.035[4]	4.735[4]	4.735[4]	6.015	7.735	8.885	....	....
Salt Lake City	4.81	....	6.70	5.94	5.84	....	5.29	5.29	5.19	6.49	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 10,000 lb; (6) 2000 lb and over; (7) 3500 lb and over; (8) 1000 lb and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 29.1¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	31.00	31.50	32.00	32.50	.....
Birdsboro	31.00	31.50	32.00	32.50	38.00
Birmingham	26.38	26.88	....	....	.....
Buffalo	30.00	30.50	31.00	31.50	38.00
Chicago	30.00	30.50	30.50	31.00	...
Cleveland	30.00	30.50	30.50	31.00	.....
Detroit	30.00	30.50	30.50	31.00	.....
Duluth	30.50	31.00	31.00	31.50	.....
Erie	30.00	30.50	31.00	31.50	.....
Everett	29.00	29.50	30.00	30.50	.....
Granite City	30.00	30.50	30.50	31.00	.....
Hamilton	28.00	28.50	28.50	....	.....
Neville Island	30 00	30 50	30.50	31.00	.....
Provo	30.00	30.50	....	....	.....
Sharpsville	30.00	30.50	30.50	31.00	.....
Sparrows Point	31.00	31.50	.....	.....	.....
Steelton	31.00	...	...	.....	38.00
Swedeland	31.00	31.50	32.00	32.50	.....
Toledo	30.00	30.50	30.50	31.00	.....
Youngstown[1]	30.00	30.50	30.50	31.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett*	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Boston	Birdsboro-Steelton	4.47	...	...	...	...	40.47
Brooklyn	Bethlehem	2.78	33.78	34.28	34.78	35.28	...
Brooklyn	Birdsboro	3.26	...	...	...	...	39.26
Canton	Clev. Ygstn, Sharpsvll.	1.54	31.54	32.04	32.04	32.54	...
Canton	Buffalo	3.55	...	...	...	...	39.55
Cincinnati	Birmingham	4.30	29.80	31.18	.....	.....	.....
Cincinnati	Hamilton	1.24	.....	.....	29.74	.....	...
Cincinnati	Buffalo	4.89	...	...	...	...	40.89
Jersey City	Bethlehem	1.70	32.70	33.20	33.70	34.20	.....
Jersey City	Birdsboro	2.16	...	...	.....	.....	38.16
Los Angeles	Provo	5.25	31.25	31.75	.....	.....	.....
Los Angeles	Buffalo	16.33	...	...	...	...	52.33
Mansfield	Cleveland-Toledo	2.16	32.16	32.66	32.66	33.16	.....
Mansfield	Buffalo	3.74	...	...	...	...	39.74
Philadelphia	Swedeland	0.93	31.93	32.43	32.93	33.43	.....
Philadelphia	Birdsboro	1.38	...	...	.....	.....	37.38
San Francisco	Provo	5.25	35.25	35.75	.....	.....	.....
San Francisco	Buffalo	16.33	...	...	.....	.....	52.33
Seattle	Provo	5.25	31.25	31.75	.....	.....	.....
Seattle	Buffalo	16.33	...	...	...	...	52.33
St. Louis	Granite City	0.50 Arb.	30.50	31.00	31.00	31.50	...
St. Louis	Buffalo	7.86	.....	.....	.....	.....	43.86

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace. Delivered to Chicago, $42.34.

High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$36.00; f.o.b. Buffalo—$37.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05	6.30	6.60
Ton lots	6.65	7.55	8.55
Less ton lots	6.80	7.80	8.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$39.00	$40.00
F.o.b. Pittsburgh, Chicago	44.00	

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.45
Ton lots	6.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet.	5.80
Ton lots	6.30
Less ton lots	6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $53.25 f.o.b. Keokuk, Iowa; $50.00 f.o.b. Jackson, Ohio; $51.25 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10	13.55	16.50
97% Si, 1% Fe	13.45	13.90	16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.

	Eastern	Central	Western
Carload, bulk	3.60	3.75	3.90
Ton lots	4.15	4.55	4.60
Less ton lots	4.40	4.80	4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.45	7.45	7.65
75% Si	9.25	8.70	9.25
80-90% Si	9.50	9.65	10.15
90-95% Si	11.80	11.95	12.40

Ferrochrome

(65-72% *Cr, 2% max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
66-71% Cr, 4-10% C	15.60	14.90	15.00
62-66% Cr, 5-7% C	15.05	15.45	15.55

Briquets — contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.20	9.50	9.90
Ton lots	9.80	10.30	11.80
Less ton lots	10.10	10.60	12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	15.60	16.00	16.10
Ton lots	16.65	17.30	18.50
Less ton lots	17.30	17.95	19.15

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	12.00	12.75	14.75
Less ton lots	12.50	13.25	15.25

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	11.75	12.50	14.50
Less ton lots	12.25	13.00	15.00

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00	12.85	14.60
Less ton lots	12.50	13.35	15.10

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.81
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.35
Less ton lots	$2.50
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.20
Less ton lots	$1.30
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	6.25¢
Ton lots	6.75¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.50¢
Ton lots	9.25¢
Less ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1448

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

carload lots	25¢
Ton lots	26¢

Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots	58¢
Ton lots	59¢

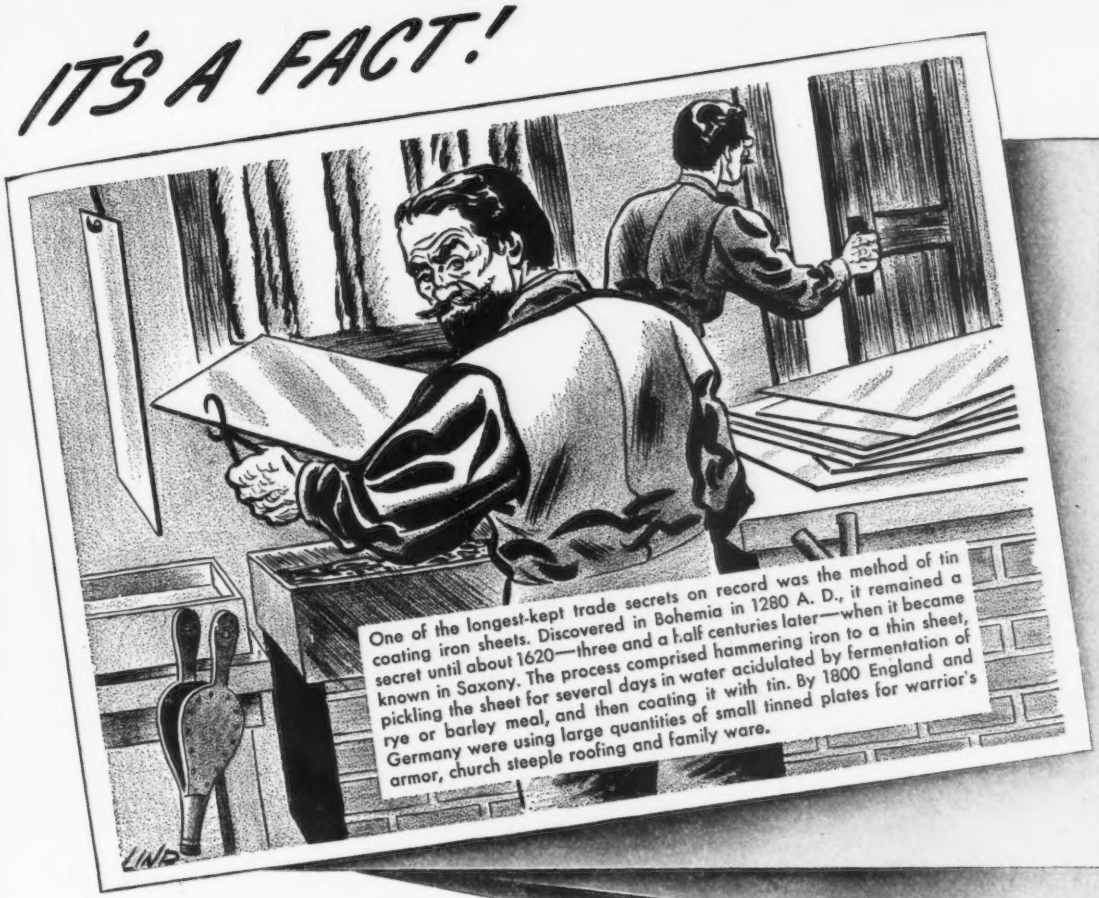
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

IT'S A FACT!



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JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

J&L STEEL

Ash in Sizable Pieces is Handled Efficiently with this Pump . . .

The ash produced by the boilers in a midwestern power plant is in sizable pieces, which would not pass through the vertical shaft pumps formerly used. Large pieces remained in the sump and built up until the pump became inoperative. Men formerly had to crawl down in the sump, after it was drained, and remove the large pieces manually. Too, frequent stoppage was necessitated by pieces picked up in the suction. Servicing the vertical pumps was an onerous job, as it meant removal of the units from their settings and a complete shop overhaul.

Excessive pump maintenance suggested a change to a horizontal shaft pump which could be installed at floor level. Amsco-Nagle Pumps were known to the power company, as Amsco manganese steel water ends were used on its vertical pumps for maximum service life under the severe abrasive wear of ashes pumping.

The priming problem was overcome by the use of Amsco's priming inductor, which makes priming practically instantaneous and requires no valves in either the suction or discharge line. To make possible the passage of a larger percentage of the bigger material, a larger pump was chosen. In view of past high pump repair costs, it was decided to operate the new pump at considerably lower speed than the original pump. As floor space was limited and head room more abundant, overhead motor mounting was specified.

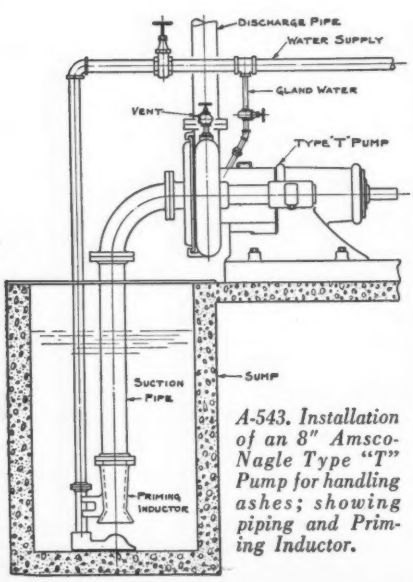
The 8" Type "T," Frame 24 Amsco-Nagle Ball Bearing Horizontal Shaft Pump shown in Picture A-542 was

A-542. 8" Type "T" Frame 24 Amsco-Nagle ball bearing horizontal shaft pump with 50 H.P. 1200 R.P.M. overhead mounted motor and "V"-belt drive for handling ash. Accessibility to the unit is noticeable.

installed in this power plant in November, 1944. Sketch A-543 shows the installation, including the priming inductor. Accessibility is a valuable characteristic here.

The Amsco-Nagle pump has proved, in two years of operation, not only highly satisfactory from a low-maintenance standpoint, but has also eliminated the nasty job of manually cleaning the pump and suction line in this plant.

We welcome tough and unusual pump applications. Write for literature on Amsco-Nagle Pumps.



A-543. Installation of an 8" Amsco-Nagle Type "T" Pump for handling ashes; showing piping and Priming Inductor.

Joliette Steel, Limited, Joliette, Quebec, owned by American Brake Shoe Company, produces and sells Amsco Manganese Steel Castings in Canada.

London Economist

(CONTINUED FROM PAGE 121)

with the next item." "Not at all," objected the Russians. "We thought you would not agree, and were prepared accordingly. Now we have to cable back for fresh instructions."

All this tries the public patience, irritates them, at moments enrages them, but so far it has not bored them. The Russians are still prime news material. Photographers still cluster around Mr. Molotov. Wealthy hostesses who entertain Mme. Gromyko tell each other that she never wore shoes until she was 16 in the same tone of excitement that pervaded British hostesses 300 yr ago when they told each other the same thing about the Indian bride of Capt. John Smith.

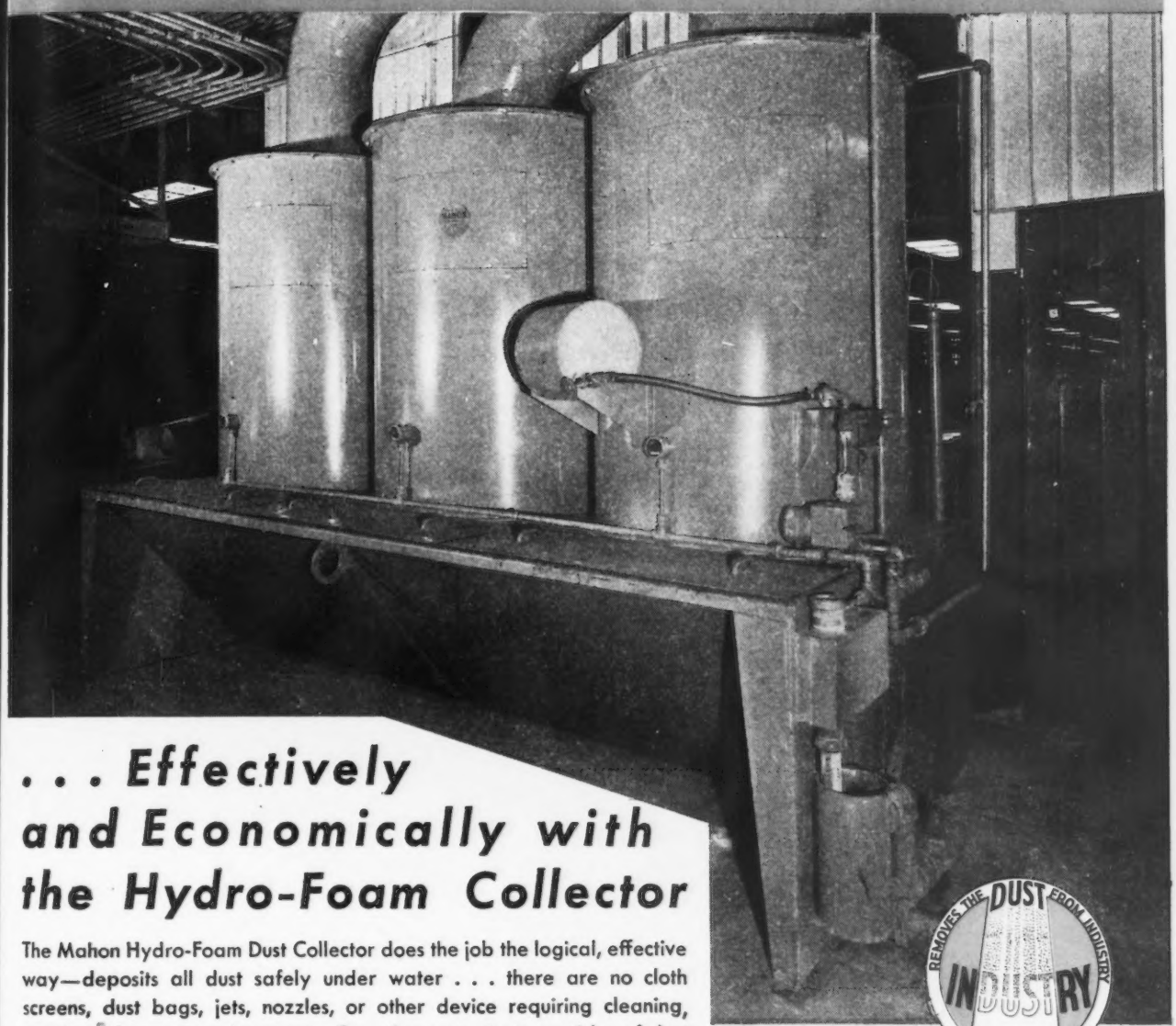
Along with exasperation and some fear goes a certain pleased recognition that Russian tactics no longer seem as alien or mysterious as they once did. Verbal assaults and table-pounding to gain time are not unknown to the more flamboyant of our politicians. The only surprise is that they should turn up in international diplomacy where we had expected methods more suave, and less familiar.

Meanwhile the education of Mr. Byrnes and other members of the American delegations proceeds at closer range, but conditioned by the same American habits of reaction. The Secretary has always been noted for a shrewdness described in the gambling phrase as "playing his cards close to his chest." Latterly there have been signs that he has been playing them with improved finesse.

In late October the Soviet put on a 3-day show of cooperation that astonished the press—dropped its fight in the Assembly General Committee to keep off the agenda proposals that would modify or abolish the veto, returned amiable answers (in the high person of Mr. Stalin) to a whole set of questions put by the head of an American news agency, joined 32 other nations in attending a solemn pontifical mass. Optimists proclaimed the deadlock broken.

The fourth day, Mr. Molotov swung straight for any chin thus rendered off guard. He denounced the American approach to interna-

Now You Can Eliminate DUST



. . . Effectively and Economically with the Hydro-Foam Collector

The Mahon Hydro-Foam Dust Collector does the job the logical, effective way—deposits all dust safely under water . . . there are no cloth screens, dust bags, jets, nozzles, or other device requiring cleaning, repair or frequent replacement. Even the most minute particles of dust are trapped and removed from the air by the Foam Bed. These collectors are produced in standard units of 3000 cfm capacity—multiple units are employed to handle any amount of air to cope with any dust condition. Have a Mahon engineer explain to you the advantages of this patented Hydro-Foam principle.

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Detroit 11, Michigan • Western Sales Division, Chicago 4, Illinois

Engineers and Manufacturers of Dust Collecting Systems, Complete Finishing Systems, Annealing Ovens, Core Ovens, and many other Units of Special Production Equipment.

REMOVES THE DUST FROM INDUSTRY

The battery of Mahon Hydro-Foam Dust Collectors illustrated above is one of two batteries serving a buffing and polishing department in one of the great mid-west automobile plants. The patented Hydro-Foam Collector may be manifolded together in batteries of two, three or four to a common sludge tank, and any number of batteries may be employed to meet capacity requirements.

MAHON

tional atomic control, said flatly that "Truth is not on the side of the American plan," called Winston Churchill a "prophet for imperialists" who seek to dominate and control the world. It was, said the *New York Times*, "the most deeply disturbing speech ever delivered before the United Nations."

The American reply was delivered not, as might have been expected, by Secretary Byrnes, but by Senator Austin. It agreed with that part of Molotov's speech which called for the International reduction of armaments and left the rest to silence and history. Thirteen days passed, including the election period before the sledge hammer got to work again. Then Molotov, changing his stance, demanded in substance that the Council of Foreign Ministers discard 8 months' work and start all over again on Trieste.

That Byrnes himself, brought up as a lawyer and addicted to the case method of settling one thing at a time and going on to the next, even though the one thing may be subject to reopening on appeal to a high court, finds such tactics difficult, is no secret. The same habit of thought may be one reason why he has shown small signs of seeing the problem of peace as a whole, but prefers to consider individual settlements as parts which must remain subject to adjustment until the whole is solved.

His task has been rendered no easier since the election. Not only does he represent an administration to which a virtual vote of no confidence has been given, but within that administration the spokesman of the Left wing, Mr. Wallace, has come out in opposition to the policy toward Russia which Byrnes is developing.

Against this must be balanced the interparty nature of our present foreign policy and the rebuke administered with particular fervor at the polls to the Democratic left wing. Just where this leaves Byrnes' support within the United States can only be ascertained by higher calculus, but the general answer is that he still has the country with him, in principle if not in detail.

Thus he might have difficulty persuading the American public to accept any plan that would give Russia complete control of the Dan-

ube, even though that price would free Germany from its present four-power paralysis and start the economic recovery of Western Europe. This would not, however, mean that his compatriots were repudiating him, but merely that they, too, see the peace as a series of separate problems which they want settled their way.

Americans recognize this, but it seems not to be understood abroad, and there is still room for the education of foreign delegates who think that they can take advantage of the Republican victory for their own ends by attacking the policy for which the Secretary stands.

Gallup Polls

(CONTINUED FROM PAGE 117)

possibility of such a party, with liberal leanings.

Ultimately it comes down to the question of how many voters would be likely to support a third party. How much dissatisfaction is there with the two major parties now?

A survey by the institute indicates that there is no widespread demand among voters today for a third party formed by organized labor. It would likely draw the support of about one voter in ten in the general population.

Among labor union members, however, it would have a more extensive backing.

Attitudes toward a possible third party were sounded in a nationwide poll by the institute on the following question:

"If a third party is formed in this country by Henry Wallace, Claude Pepper, the CIO and other labor groups, do you think you would vote for that party?"

The national result:

	Pct
Yes	10
No	78
No	12

Such a party would draw much more heavily from the ranks of the Democratic party than from the Republican party.

It would also have a considerable appeal to independent voters —people who do not consider themselves regular Republicans or regular Democrats—as the following table indicates.

	Yes Pct	No Pct	No Opinion Pct
Republicans	3	91	6
Democrats	13	73	14
Independents	18	65	17

Recommends Meticulous Care as Foundation Of Industrial Research

New York

• • • **Meticulous scientific** investigation, checked at each turn by tests which leave no human shadow of doubt, is recommended by Dr. John Johnston, retiring director of research, U. S. Steel Corp. of Delaware, as the foundation for industrial progress in peace and in war. The scientist set down his thoughts, gathered from a busy lifetime of creative research, in a statement on the "Scientific Approach to Technical Problems."

The course of World War II "would have been very different," he said, if it had not been for scientific knowledge "gained almost entirely from research undertaken prior to the war to satisfy the curiosity of investigators, but with little thought of its practical use." As examples of scientific discoveries which proved practical in achieving victory Dr. Johnston cited radar, the atomic bomb, the widespread use of blood plasma and penicillin—as well as his own laboratory's isothermal transformation diagrams, published before the war, which enabled war industry to get a maximum production and heat treatment of shells, bombs and many other war supplies from the limited number of furnaces which could be obtained quickly.

These diagrams, he asserted, likewise aided greatly in selecting steels which could be most readily heat treated in the emergency to obtain the necesary combinations of qualities. As a quite different instance, he added, "our knowledge of how to interpret indications of magnetic tests, made by using equipment we had developed, was applied to separate 'good' from 'bad' material when an immediate answer was imperative."

Dr. Johnston explained that in the production of steels pre-eminently satisfactory for their contemplated purposes many problems still await solution—but many of the answers will have to await "the results of basic investigations which bear no obvious relation to the original problem." To illustrate he said that if a

group of eminent scientists had been asked a century ago to investigate the best method of illumination, the possibility of electric light would almost certainly not have appeared in their report. In other words, he asserted, the solution of a problem may come in a way "entirely different from what present practice would lead us to expect; yet this possibility is no excuse for doing nothing about it, even though we see no clear way immediately ahead."

In attacking a complex research problem Dr. Johnston recommended, first of all, a thorough analysis of the entire situation in an effort to learn what it really is "as contrasted to what it seems to be." If this preliminary analysis is not made, he said, there is usually great waste of effort in experimental work which does not lead to a definitive answer.

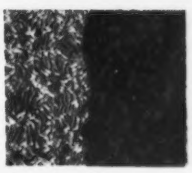
"In analyzing a problem the first, and indispensable, step is to get together all information, whatever its source, that appears pertinent," he advised. "The second is to examine these data critically in the light of such knowledge and experience as can be brought to bear upon them as a means of evaluating their relative significance or lack of it. The third step is to collate these preliminary inferences in order to discover which of them appear consistent and probably valid, to note inconsistencies or gaps in this tentative picture, then, and then only, to consider what experimental work would eliminate these uncertainties one by one.

"The next step is to decide what are to be the initial experiments. This first experimental advance should cover only that sector of the unknown which can be attacked most readily and with greatest prospect of rapid success where knowledge is deemed most necessary. Only when this first possibility has been consolidated and the new situation analyzed should the next advances be formulated and undertaken; and similarly for all subsequent stages of the investigation. This logical stepwise mode of attack from the known to the unknown is in the long run cheapest because it is the only way likely to lead to a definitive, valid solution to a problem as complex as most steelmaking problems are."

In any investigation the indis-

One Coat
WRINKLE INDUSTRIAL FINISHES

What it is...



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Wrinkle is the most versatile of modern industrial coatings. It comes in all colors and black; the Wrinkle texture or pattern may be controlled to your specific requirements. Wrinkle is hard, durable, long-lasting, practically scratch- and mar-proof. Because it is a one-coat finish, requiring no surface preparation, it is the most economical of coatings, saving both material costs and many hours of time; it does not reflect light; it is very beautiful, adding "buy-appeal" to your products. Investigate Wrinkle today!

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pensable requisite is that all factors pertinent to the result be under control, the scientist warned, and that they be varied one at a time so the precise influence of each may be properly evaluated. He said this can not always be done but assured that when it is done the conclusion from a single good experiment outweighs any inferences from observations, no matter how numerous or apparently authoritative, made under conditions which are not adequately run or controlled.

"The foregoing directions outline the scientific method of approach," he asserted; "namely to proceed from the known into the great unknown by a series of steps each supported by experiments that yield the same results no matter who makes them or where they are made. For this reason, moreover, the experiment need not be a new one; it may well have been made years ago, whence the advisability of studying the literature before proceeding far with any technical investigation.

"Yet this piece of knowledge thus ascertained may not prove to apply directly to practice. If so, this is evidence that the conditions in practice differ somehow from those set up in the experiment, and a renewed analysis is called for to find the source of this difference and how it can be taken into account."

Passenger Car Makers Report 9-Month Loss

Detroit

• • • **A net loss of $5,493,046 was sustained by passenger car manufacturers in the first 9 months of 1946, according to an industry-wide survey, announced by the Automobile Manufacturers Assn.**

Calculated after tax credits, the deficit represents a net loss of 0.2¢ on every dollar of sales for the period.

Increased production during the third quarter of 1946, partially offsetting the net loss of 3 pct of sales reported for the first half of 1946, brought passenger car makers close to, but still short of, the industrywide "breakeven" point, despite inclusion of tax credits.

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U. S. Bureau of Mines Reveals Extensive Data On German Iron Ores

Washington

• • • **Iron ore reserves** of Germany in the American and British occupied zones are estimated at approximately 375 million metric tons of commercial grade with additional tonnages of potentially commercial ore, the Bureau of Mines disclosed in a comprehensive report on iron ore resources and mining operations in German territories west of the Elbe River.

Based on reports to the Economic Branch of the Office of Military Government, U. S. Zone, from September, 1945, to February, 1946, and other technical information secured by John A. Church, a consulting engineer for the Bureau, the survey of German iron ore resources forms a supplement to the Bureau's October Mineral Trade Notes, Dr. R. R. Sayers, Bureau Director, reported to Secretary of the Interior J. A. Krug.

Because of the widespread interest in the post-war industrial terms to be laid down for Germany, this supplement is expected to prove invaluable to the American iron and steel industry in reviewing conditions in Germany, Dr. Sayers pointed out.

Even under the most lenient terms of post-war operation, the production of iron and steel in Germany in the future is expected to be far below the level of the war and the preparatory prewar years. This anticipated curtailment of production coupled with possible restrictions on imports places special significance on German iron ore reserves. Under rigid terms of operation, the country may be permitted to export some iron ore and with less severe regulations the country may utilize the reserves within the country.

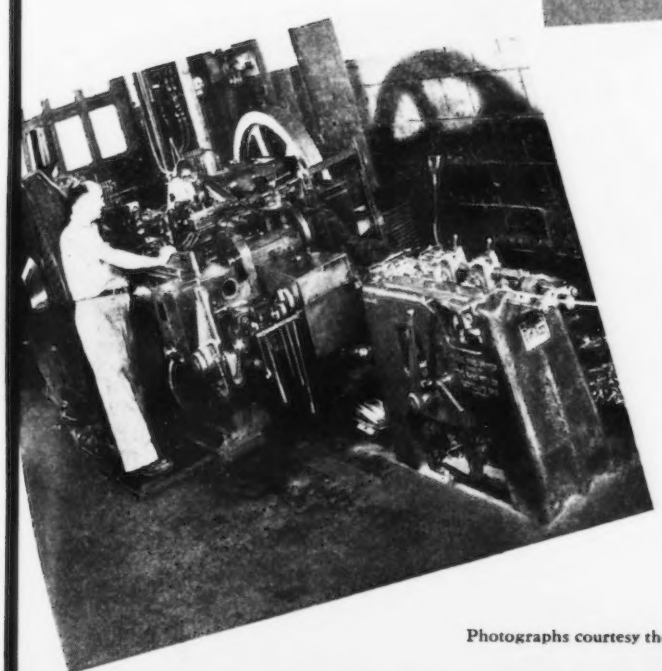
Most of Germany's iron ore, however, is of low grade and for many years before the end of the war was supplemented and in many cases abandoned in favor of higher grade iron ores imported from accessible countries. German ores rang from 21.8 pct iron in the Vogelsburg district to 43.0 pct iron in the Bavarian deposits, compared with 52.3 pct iron in the great Lake Superior deposits in this country.

The Ilsede-Peine and Salzgitter

COLD HEADERS NEED

AJAX-HOGUE

WIRE DRAWERS



THE efficiency and quality of product of Cold Headers is materially stepped-up by the attachment of AJAX-HOGUE wire drawers. The wire, being freshly drawn to unvarying diameter as it is perfectly coated and fed to the header dies, heads easier, more uniformly and with much less wear on the header dies. This improvement in cold heading substantially lowers the cost of production in addition to the saving effected by the use of hot rolled rod instead of cold drawn wire.

Write for Bulletin No. 111.

Photographs courtesy the Chandler Products Corporation.

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districts of western Germany, lying wholly within the British zone of occupation, constitute the largest single reserve of the country. These districts alone contain about 45 pct of western Germany's total reserves, the commercial grade ore averaging from 30.5 to 32.5 pct iron being estimated at 170 million metric tons.

Although less extensive, the Siegerland-Wied district containing about 80 million tons of commercial grade ore and 18 million tons of second-grade ore, holds an equally important position in Germany's industrial future. The Siegerland - Wied district continues to be Germany's principal source of domestic manganese and as late as 1929 the district was the country's leading producer of iron. Carrying from 5 to 7 pct manganese as mined, this ore reserve is all the more important because of its proximity to the Ruhr blast furnaces.

Another important domestic source of manganese west of the Elbe is the Taunus district containing about 2 million tons of commercial grade ore, the outlying deposits of which average from 13 to 17 pct manganese. Thus, under limited operating conditions, Germany could be self-sufficient in manganese, the most important of the ferroalloy metals essential in the making of steel.

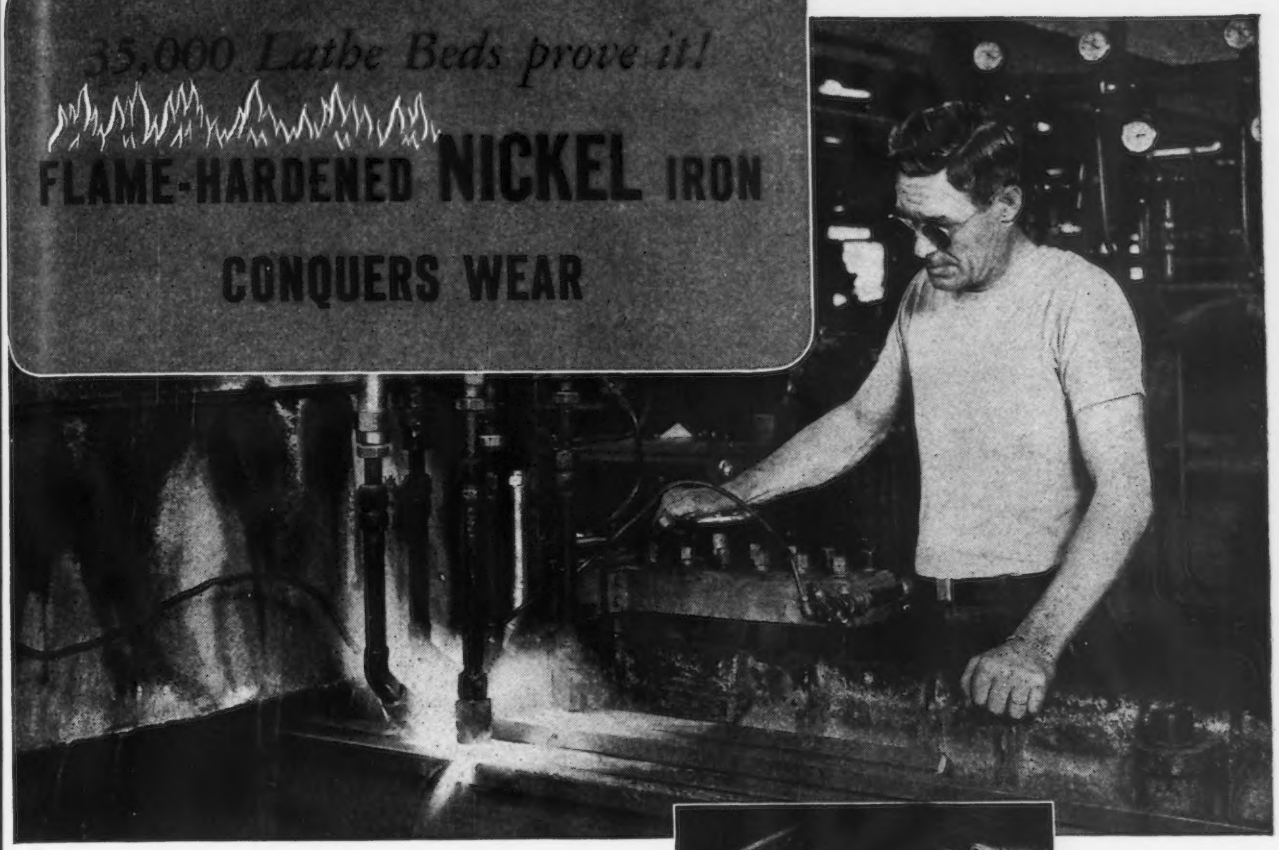
Other principal German ore reserves with estimated tonnages include Thuringen-Sachsen, 80 million tons of all grades; Lahn-Dill, 32 million tons of commercial grade and 35 million tons of second-grade; Bavaria, 24 million tons, commercial grade; Vogelsburg, 12 million tons, commercial grade; and Harz, 6 million tons, commercial grade, and 12 million tons, second-grade.

Detailed information on hundreds of individual surface and underground mines in western Germany are included in the Bureau's Mineral Trade Notes supplement, along with data on war damage when obtainable, railroad and marketing facilities, and in some cases the approximate costs for rehabilitation and resumption of production.

A free copy of the survey of German iron ore resources west of the Elbe may be obtained by writing to the Bureau of Mines, Dept. of the Interior, Washington 25,

35,000 Lathe Beds prove it!

FLAME-HARDENED NICKEL IRON CONQUERS WEAR



During the past 5 years The Monarch Machine Tool Company has built more than 35,000 lathes.

So, they know a lot about lathes . . . and lathe *beds,* too.

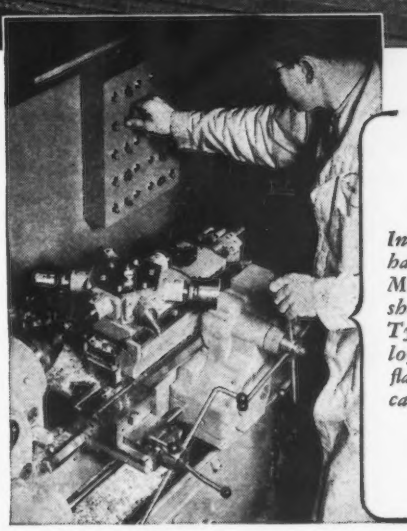
They know how to build beds that resist abrasion, scoring, wear . . . and maintain high accuracy to keep users' production costs low.

That's why Monarch specifies Nickel alloyed iron for all beds.

Experience shows good reason for this. For example, when their Nickel iron lathe beds, 8½ feet long, are flame-hardened to a depth of ⅛″ to ¼″, the warpage is only about 0.01″. During finishing, this is ground off and final tolerance is only 0.0005″.

The Nickel in the cast iron lowers the critical transformation range . . . thus, gives greater depth of hardness than in plain iron and minimizes distortion. Moreover, there is gradual blending of the flame-hardened layer into the softer pearlitic interior, whereas in unalloyed iron the transition zone is apt to be completely graphitized and hence extremely weak.

Consult us on the use of Nickel to meet your casting requirements. Send us details of your problems today.



In this SPEED-MATIC *hand screw machine, Monarch uses gears, shafts and pinions of Type 8749 Nickel alloy steel, along with flame-hardened Nickel cast iron beds.*

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

D. C., and requesting the supplement to the Bureau of Mines Mineral Trade Notes for October, 1946. Material in this supplement was compiled during a 6-month European tour of duty in the Army by Lt. Col. John A. Church, editor of the third and fourth editions of Peele's Mining Engineers' Handbook.

Italian Foundry Workers Will Go to England To Relieve Labor Scarcity

Rome

• • • **Italian foundry** workers will go to Britain to relieve the labor scarcity in the foundries, following an agreement signed recently between the British and Italian Governments.

British Ministry of Supply technical experts will start by choosing 2822 skilled men, and the first batch of 400 for whom jobs are already waiting is expected to leave Italy in January. On departure they will receive the free gift of an overcoat, boots and a sweater, and will be given clothing coupons on their arrival in Britain. Their wages, insurance and housing conditions will be equal to those of British workers, and they will become members of the appropriate British trade union which will undertake to protect their interests.

Three months' work at least is guaranteed, and the men will be granted bonuses to assist them in settling down, plus a repatriation grant on termination of contract, while their dependents will receive a small expatriation grant. Permission will be given to remit to Italy a maximum of $20 a month for a single man and $40 for men with dependents. On returning to Italy the workers will receive a permit from the exchange control office to take any savings with them provided satisfactory proof is furnished that the sums come from earnings and not from other sources. The men are pledged not to change their jobs while in Britain and must work where they are assigned.

If the experiment proves satisfactory the agreement may be extended to other British industries where there is a labor scarcity.

Gettin' dizzy?

If the things you hear about stainless steel have you whirling in circles, come to Rustless. We'll turn on a steady flow of helpful, authoritative information about stainless—how to machine, forge, heat-treat, cold-work, electropolish the most economical grade for your service conditions and fabricating requirements. Stainless is not difficult to work with, only a little different. If you are puzzled about how to turn stainless into your product, for sales appeal, for long life at low maintenance—for example, in high pressure needle valves—just tap the Rustless reservoir. Our cooperation is without obligation.

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STAINLESS STEEL SPECIALISTS Rustless DIVISION OF ARMCO

World Trade Group Winds Up First Stage Of Trade, Labor Study

London

• • • **The Preparatory Committee** of the International Conference on Trade and Employment has completed the first stage of its work. The final plenary meeting of the first session took place on Nov. 16, when the reports of five subcommittees were adopted by the committee as recommendations.

The groundwork for the proposed World Trade Conference has thus been provided. The Preparatory Committee, with its London session concluded, is expected to assembly for its second session in Geneva, probably in April next. In the meantime a committee will meet in New York in January to prepare a draft charter based upon the report and other documents of the first session.

The second session of the Preparatory Committee will discuss further the problems studied in London and also undertake the discussion of specific tariff problems. It will prepare the agenda for the world trade conference which is expected to take place in the fall of 1947.

One of the most important of the committee's recommendations is that the member nations should accept an obligation to maintain full employment and high and stable levels of effective demand as an essential means of expanding world trade. By formulating a full employment policy in terms of international obligation the committee has broken new ground.

The main objectives of the employment policy have been defined to include also the avoidance of under-employment, since in the less industrialized countries deficient demand shows itself not so much in mass unemployment as in under-employment or unprofitable employment among primary producers. There has been much discussion of the meaning of the term "full employment." It has been interpreted as "a condition in which useful employment opportunities are available to all those able and willing to work."

The committee has agreed that the countries of the world owe a responsibility not only to their own citizens, but to other coun-

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INDUSTRY asked for a seamless tubing with high magnetic permeability, uniform ductility, softness, toughness, and corrosion resistant properties. We supplied it in Globeiron Seamless Tubing. Because of its right combination of all these properties, Globeiron is extensively used in the electrical and radio industries; housings for generators and motors are frequently fabricated from Globeiron. It is extensively used for many pressure tubing applications. It can be worked hot or cold.

Some of your tubing problems may be profitably solved through the use of Globeiron Seamless Tubing. Globe engineers, Globe laboratory facilities are at your service. Write for Bulletins 109A and 113.

GLOBE STEEL TUBES CO.
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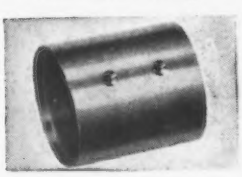
GLOBE TUBES

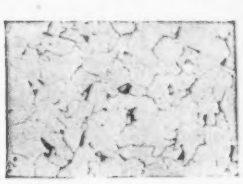
Globeiron is a high purity, low carbon iron, often known as "ingot iron". The physical properties of Globeiron make it ideal for difficult forming operations.

High Magnetic Permeability

(Generator Housing)

Housing for generators and motors may be thinner and lighter when made of Globeiron. The shell of the Dynamotor shown here is an example of Globeiron adaptability.





Under the microscope (mag. 200x Nital Etch) Globeiron shows a uniform structure of almost pure ferrite with only occasional patches of pearlite.

★ PRESSURE TUBES
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tries, to do all that is within their power to maintain full and productive employment and high and stable levels of demand within their own territories. It is left to each country to decide what measures it will take for this purpose.

Emphasis has also been placed on the maintenance of fair labor standards. If full employment is to make its due contribution to the "higher standards of living" and "conditions of economic and social progress" to which Article 55 of the Charter of the United Nations refers, it is necessary that a fair share of the product should accrue to the worker.

Although labor standards cannot be uniform in all countries, there is wide support for the view that all countries should agree to take whatever action may be appropriate and feasible to eliminate substandard conditions of labor in their production for export and generally throughout their economies. It is recognized that the International Labor Office is charged with the problem of labor standards, but it is felt that the I.T.O. charter should also include a reference to the subject in view of its importance for the flow of international trade.

On the question of trade restrictions, the committee has made recommendations elaborating and revising the article of the charter covering the provisions on most-favored-nation treatment, tariff reduction negotiations and the elimination of preferences. Negotiations for tariff reduction are to be on a "reciprocal" and "mutually advantageous" basis. This means that no country would be expected to grant concessions unilaterally, without action by others, or to grant concessions to others which are not adequately counterbalanced by concessions in return.

The proposed negotiations are also to be conducted on a selective product-by-product basis, to afford adequate opportunity for taking into account the circumstances surrounding each product on which a concession may be considered. Under this selective procedure a particular product may or may not be made the subject of a tariff concession by a particular country.

If it is decided to grant a con-

SPECIAL or ROUTINE

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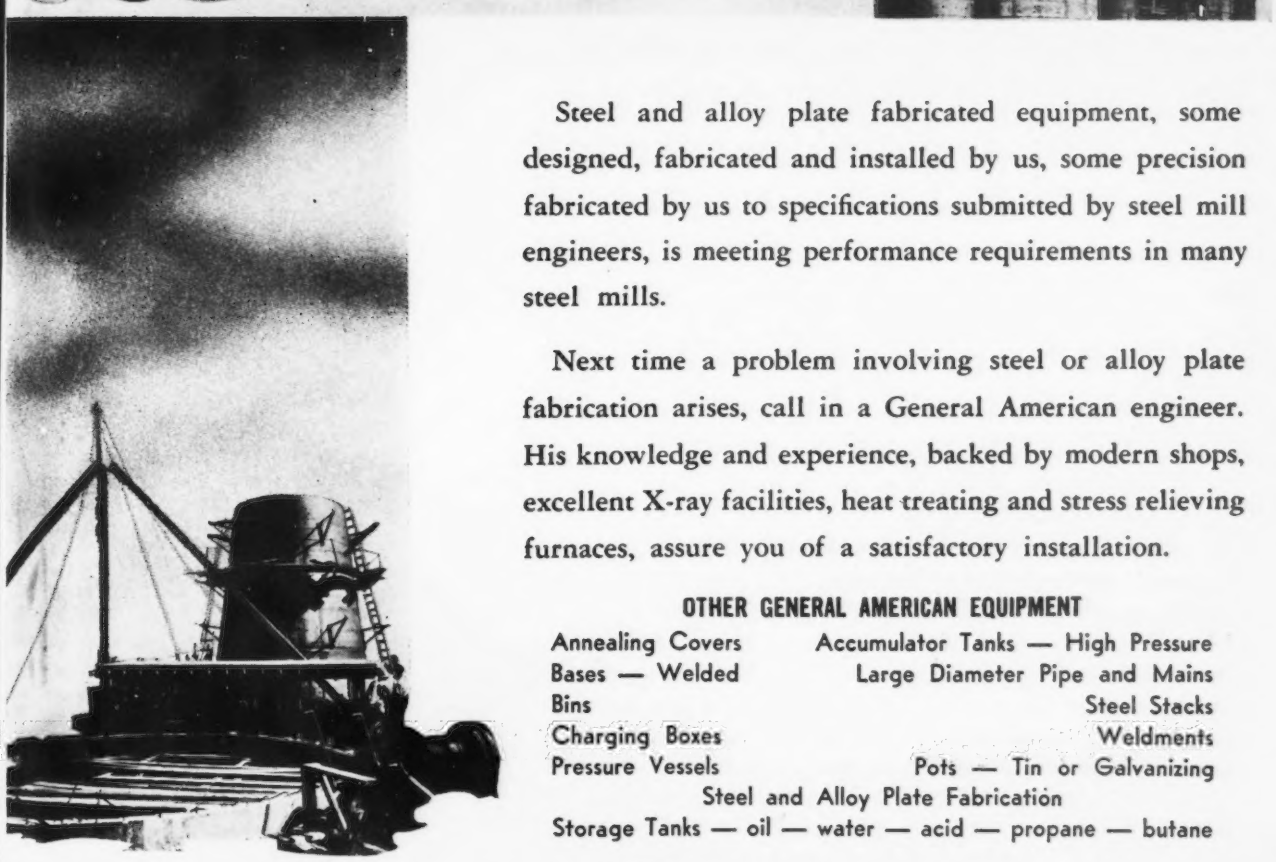

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cession on the product, the concession may either take the form of a binding of the tariff against an increase or a reduction of the tariff. If the tariff on the product is reduced, the reduction may be made in greater or lesser amount. Thus, in seeking to obtain the substantial reduction of tariffs as a general objective, there is ample flexibility under the selective procedure for taking into account the needs of individual countries and individual industries.

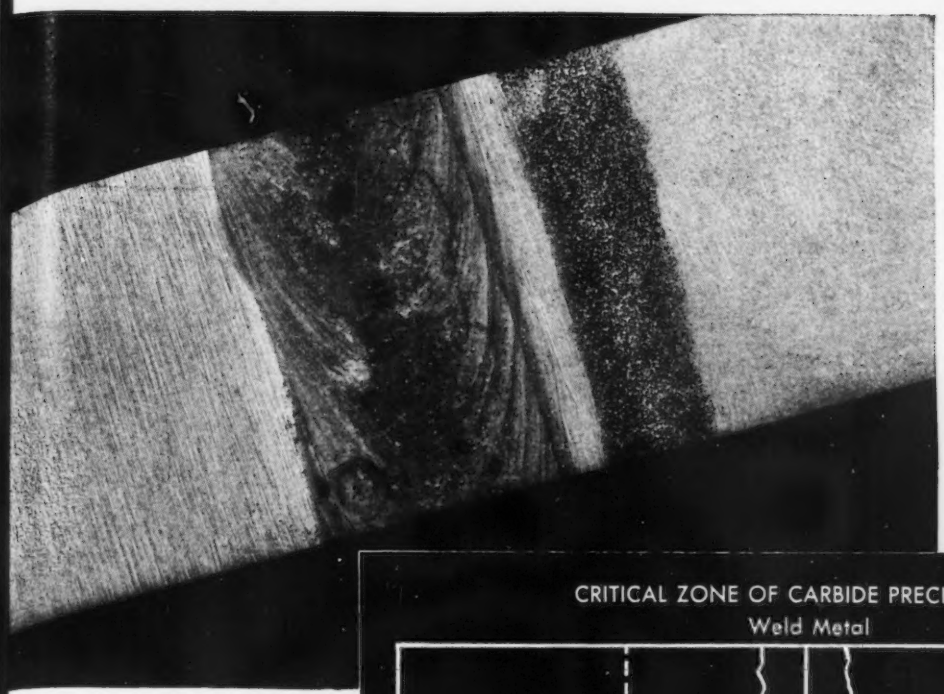
In the originally suggested charter, it was recommended that preference should be eliminated entirely, with the exception of territories in respect of which there existed on July 1, 1939, common sovereignty or relation of protection or suzerainty (i.e., the British Commonwealth) and preferences between the U. S. and Cuba. These preferences were not to be increased above their level on July 1, 1946.

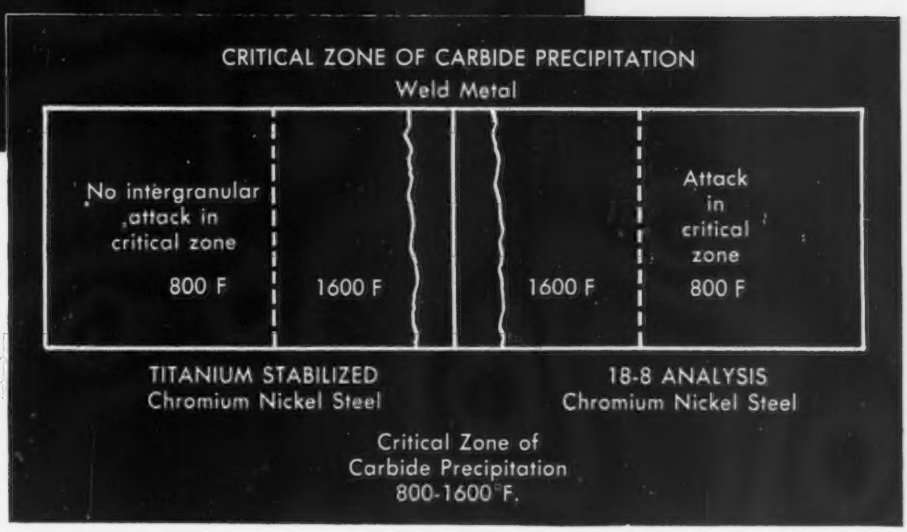
However, the discussions during the first session of the Preparatory Committee indicate that the establishment of a common date presents certain difficulties and may not be practicable. It is therefore suggested that immediately following the close of the first session of the committee each member of the committee concerned should inform the Secretariat of the United Nations as to the date which it proposes to use as the base date for negotiations with respect to preferences.

Quantitative restrictions have been one of the most controversial subjects before the committee. The draft charter proposed to abolish quantitative restrictions in general, but many delegations stressed the existence of exceptional circumstances which they consider would justify the use of restrictions in specified circumstances under specified conditions.

There was general agreement for the view that it should be permissible for a country to restrict imports when such restriction was necessary to safeguard its external financial position, particularly in view of the fact that in many cases there will be domestic employment, reconstruction, development or social policies which result in increase in the demand for imports.

But it was thought essential to





HOW Titanium Prevents Intergranular Corrosion in Welding Stainless

In the welding of austenitic stainless steels, the retention of carbides in solution is not possible because the resulting heating between 800 and 1600°F. precipitates the carbon present as chromium carbides in an intergranular pattern. In this condition the zones near the welds are predisposed to intergranular corrosion in certain media.

Titanium, the stabilizing element, prevents precipitation of chromium carbide in an intergranular pattern by virtue of the fact that it has greater affinity for carbon than any other element has for carbon, and accordingly, the carbides of titanium are uniformly dispersed thereby preventing intergranular precipitation and corresponding intergranular corrosion.

TAM

TITANIUM ALLOY MANUFACTURING COMPANY

Executive Offices: 111 Broadway, New York City *General Offices and Works:* Niagara Falls, N. Y.

insure that such a safeguard should be available for the protection of a country's external financial position without giving freedom to unnecessary use of import restrictions.

There was wide agreement with the view that countries should undertake to observe certain principles in the use of such import restrictions, and that since the fundamental objective was to safeguard a country's external financial position these principles should be based upon movements in the country's monetary reserves.

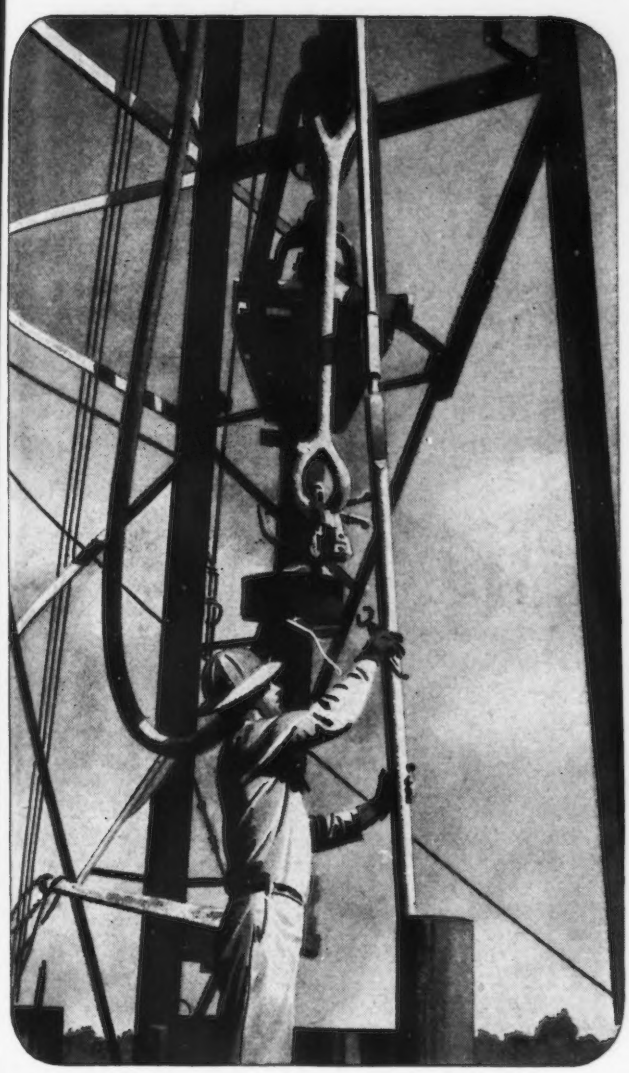
The draft charter recommends the abolition of export subsidies. But in discussions, some members thought that subsidies to domestic production should also be condemned, because they also may affect the channels of trade. In any case in which it is determined that payment of subsidies prejudices the interest of any member, the member granting such subsidies shall undertake to discuss the possibility of limiting the subsidization.

There has been considerable difference of opinion on the question of the policy of the I.T.O. in relation to restrictive business practices, but these differences have been successfully reconciled. The committee has not attempted to define precisely what is meant by restrictive business practices, but has taken the phrase to mean broadly those practices in international trade which control competition, limit access to markets or foster monopolistic control.

Since it was clear that governments would be unlikely to agree in their judgment of the effects of particular practices, it was agreed that the Organization's most important function would be to receive complaints and investigate them.

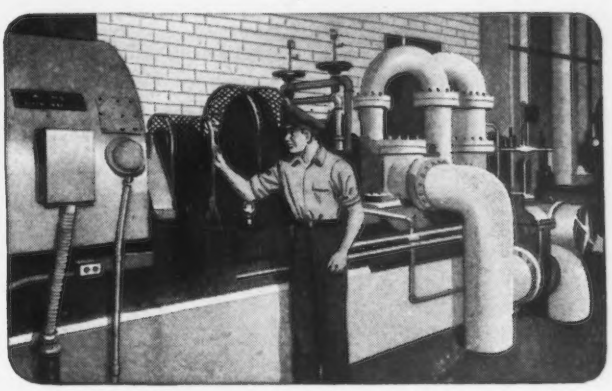
By this procedure it is hoped that gradually a code of harmful international business practices will be built up, on the basis of actual cases decided by I.T.O. It was recognized that the responsibilities of the Organization in this field should not affect the national laws under which some countries have made general provision for the prevention of monopoly or the restraint of trade.

Watch industry Fluid-Drive* ahead!



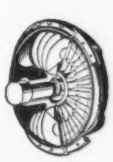
1 Oil Drilling. There's a definite trend in the derrick forests of the oil country: It's to Diesel engines and Gyrol Fluid Drive for drill rigs. Loads are taken up smoothly without inordinate strain. Naturally, equipment lasts longer and there is less time lost for repairs.

2 Mining. Looking for tough jobs? Step underground where overloads, excessive starting and stopping, and operator abuse are common practice. Gyrol Fluid Drive provides smoother operation, protects valuable equipment under this rugged use—stretches its life.



3 Power Plants. Valuable for boiler feed pumps is the variable speed control of Gyrol Fluid Drive. Wasteful throttling at feed water regulator valve is eliminated. Life of both pump and piping is increased by the use of lower pressures. Boiler efficiency is improved.

4 You? Over 7½ million horsepower (exclusive of automobiles) are driven through Gyrol Fluid Drive. This is *only the beginning!* How about your job? Let's get together.



* *Gyrol Fluid Drive is a product pioneered and developed for American industry by American Blower. It is designed for applications where smooth transmission of power or stepless variable speed control is desired. Looking beyond the long list of applications already developed, we will work with you to find new ways to "Fluid-Drive Ahead!"*

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Says Conservation Of Raw Material Reserves Is National Problem

New York

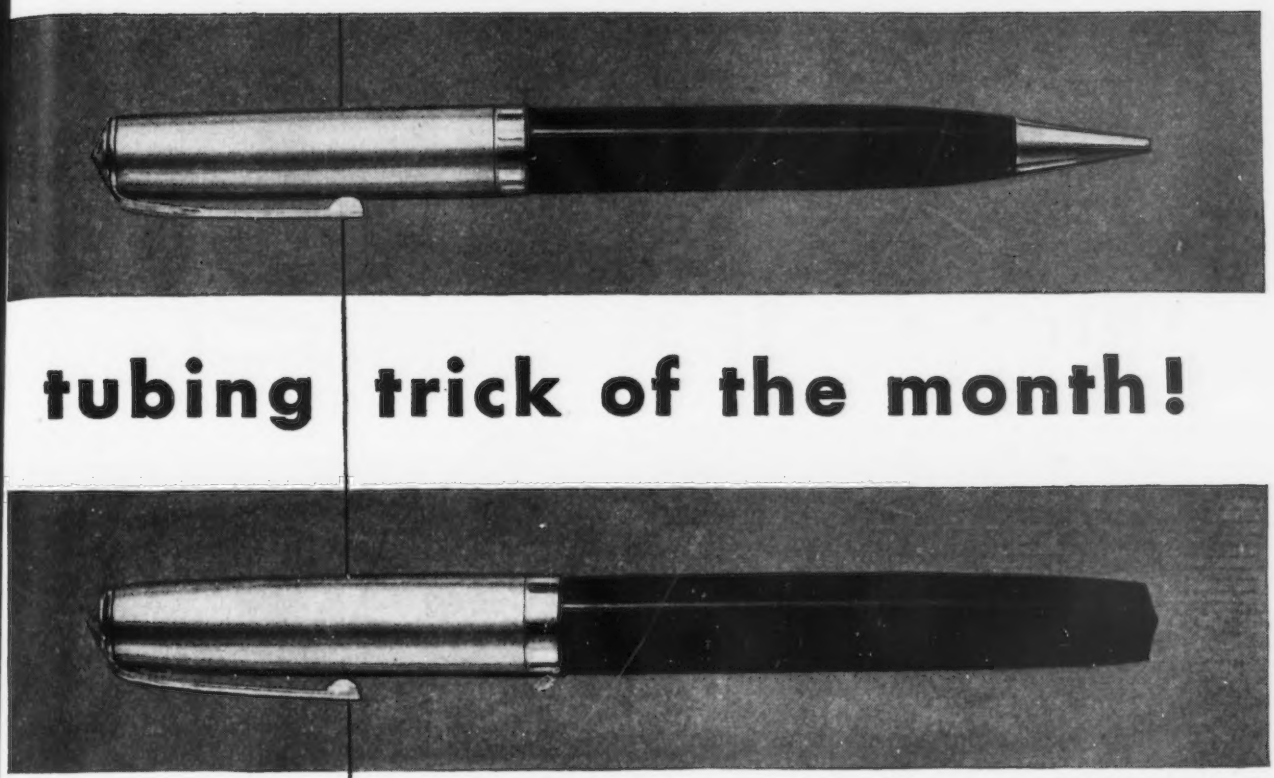
• • • **"There has been** much controversy over the problem of our raw materials reserve," said C. Girard Davidson, Assistant Secretary of the Interior, before the management division of the American Society of Mechanical Engineers at their meeting in New York.

"This has been especially true in the field of nonrenewable materials such as minerals and fuels. Some persons have asserted that the United States is faced with rapidly shrinking resources and will soon, in some major categories, be reduced to the status of a 'have-not' nation, dependent on foreign sources of supply for a major portion of its raw material requirements.

"On the other hand," said Mr. Davidson, "there are those who assert that the vast treasure of our resources has barely been scratched. These people have the firm optimism that increased exploration will readily reveal more than adequate supplies to meet our future requirements for generations to come. This argument, of course, cannot be resolved until the explorations have been made. But, on the basis of existing information, we certainly have no reason for feeling complacent.

"Far more than our comfort as the beneficiaries of a highly productive economy is involved in this question of resources. America's resources of coal and iron have been the basis of our industrial success. And our industrial success is the basis for our position as a world power.

"Although in some of the major metals and other minerals the United States is in a comparatively fortunate position, adequacy in mineral supplies no longer can be measured in terms of having satisfactory domestic supplies of iron, copper, lead and zinc. In our complex industry—a complexity rapidly increasing—scores of minerals are required. Even though the demand for some minerals may amount to no more than a few tons a year, measured in the amount of



tubing | trick of the month!

Courtesy of Paramount Pen Co.

Among the many unique features of the illustrated pen and pencil is a cap of swedged stainless steel tubing. Note the fine finish . . . the graceful design. How it's done is a trick well worth knowing.

These caps work push-pull, on a snug fit without threading. To Frasse engineers, the necessary I.D. tolerance of +.001—.000 was easy enough to lick — even in mass production.

But the swedging of type 304 stainless tube was a taller order. Sure, hard temper tube would work—provided it was annealed first. Trouble is, annealing thousands upon thousands of caps costs money—plenty! Softer tubes, although dispensing with annealing, had the equally costly habit of collapsing under the swedge. The final answer, found by Frasse technicians after weeks of shoulder-to-shoulder work with the fabricator, was a tube of welded stainless cold rolled strip, *redrawn* to a nicety — providing the exact temper that would swedge without caving in, yet dispense with the costly heat treatment.

Frasse, you see, distributes *every* kind of mechanical tube—so Frasse field men don't have to play favorites. Whether you want alloy, carbon *or* stainless tube — or practical help in its use—you're safe in calling on Frasse. *Peter A. Frasse and Co., Inc., 17 Grand Street, New York 13, N.Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Radcliff 5-7100) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • Jersey City • Syracuse • Hartford • Rochester • Baltimore*

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work they do in the industrial machine they deserve to be, and are, listed as essential."

Mr. Davidson went on to say, "Although we strained mightily during the war to tap all sources of vital and scarce minerals at home, we were still far from self-sufficiency in many varieties of minerals of this type. In addition to the vast amount of bauxite which we imported, from 90 to 100 pct of our supplies of asbestos, corundum, flake graphite, nickel, tin, tantalum, quartz crystals and beryl had to be imported. Over 60 pct of six others—chrome, mica, cobalt, manganese, antimony, and tungsten had to be brought in from outside our borders. We are still largely dependent on foreign sources for our total supply of some of these materials, and for large percentages of our demand for others.

"If we appraise the extent to which known commercial reserves in the United States of essential mineral raw materials might be available to supply the nation for its industrial requirements in the future, we also find little comfort. The Bureau of Mines and the Geological Survey undertook such a survey in 1944, taking as a conservative rate of consumption the base period of 1935 to 1939 and confining its estimates to minerals commercially available through existing technological practices. The Bureau and the Survey reached the following conclusions:

"The United States is deficient in flake graphite, quartz crystals, industrial diamonds, tin, and nickel. Our commercial reserves of chromite are equivalent to 1 yr supply. We have the equivalent of 2 yr of platinum; 4 yr of tungsten; 4 yr of antimony; 7 yr of vanadium; 9 yr of bauxite; 12 yr of lead; 16 yr of cadmium; 19 yr of zinc; 34 yr of copper; 40 yr of fluorspar; 53 yr of sulfur; 111 yr of iron ore; 117 yr of potash; 195 yr of anthracite, with other materials ranging from 400 yr to an indefinite period of time.

"The Congress," Mr. Davidson said, "has recognized the deficiencies and prospective shortages in our supplies of industrial raw materials by the enactment in July of this year of Senate Bill 752, 'the Stockpiling Bill.' The bill author-

es the acquisition and retention f stocks of certain critical and rategic materials within the nited States. The Secretaries of Var, Navy and Interior, acting ointly through the Army-Navy lunitions Board, are directed to etermine from time to time what naterials are strategic and crit-al. Purchases are to be made hrough the Procurement Div. of he U. S. Treasury.

"Stockpiling is not, however, a omplete answer to the require-nents of industry or of national efense. A stockpile is a form of nsurance against emergencies, but t cannot be relied on as a contin-ing source of supply, and our ational security cannot rest en-irely on stockpiles alone. The ex-perts cannot foresee with certainty the magnitude or duration of an emergency and a second line of defense is needed to provide against mistakes in stockpile plan-ning.

"**The principles of** conservation or management applicable to our industrial raw materials are obvi-ous. It is clear that action along the following lines must be taken:

"(1) We must continue and expand exploration of our re-sources and secure an adequate inventory of our reserves.

"(2) We must avoid non-essential uses of scarce and crit-ical materials and develop sub-stitutes for such scarce mate-rials wherever possible.

"(3) We must expand our use of sub-standard ores, and of raw material resources hitherto re-garded as waste.

"(4) We must have more effi-cient use of our remaining re-sources through technologic progress.

"(5) We must increase the re-covery and re-employment of scrap materials.

"These principles however are easier to state than they are to put into practice. The problems in-volved are too numerous, too di-verse in technical nature, and too interrelated in political aspect to be susceptible to solution by glib formulas," Mr. Davidson said.

Here's a mechanical tiger that takes a 30-ton bite!

THE MACHINE you see pictured above is the modern version of a coal miner's pickax.

It's a cutting machine that undercuts the face of the coal seam in preparation for blasting. The usual "bite" of this mechanical tiger blocks out 30 tons to be brought down by a single blast.

The job being done by this machine today in the mines where most of America's coal is produced used to be done by pick and shovel, with the miner wielding his pickax while lying on his side beneath the coal. This is but one example of the forward-marching program that has made America's coal mines the most productive, the most efficient, and the *safest* in the world.

Today, of all the Bituminous Coal mined underground in America, more than 90% is mechanically cut and more than 50% is mechanically loaded. Only about 5% is mined by pick and shovel!

As a result, America's Bituminous Coal miners are the most productive—and the best paid—on earth. Their average weekly pay in recent months has exceeded $60. In August, 1946, for example, their weekly pay averaged $62.37 and the hours worked per week, including travel time, averaged 42½.

During the past 20 years, over 300 million dollars have been spent by the industry for mechanization and safety equipment. And in the next five years even bigger expenditures are planned for the same purposes. This big investment by the modern and progressive coal companies has made possible for their miners the best working conditions of any coal miners in the world, and wages now higher than those earned in any other American industry.

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